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CONTENTS

ORIGINAL ARTICLES:

WILLIS C. CAMPBELL, M.D., Memphis, Tenn.—Mobilization of Joints with Bony Ankylosis 503
A. A. LAW, M.D., Minneapolis—Reconstruction of Tibia by Utilization of the Fibula..... 507
MARGARET WARWICK, M.D., St. Paul—Carcinoma of the Appendix..... 512
GEORGINE LUDEN, M.D., Rochester—Progress in Cancer Research..... 519
H. J. LLOYD, M.D., Mankato—Non-Surgical Drainage of the Biliary Tract..... 523
GEORGE E. SHAMBAUGH, M.D., Chicago, Ill.—Otolaryngology and the General Practitioner. 526
CHESTER H. CLARK, M.D., Gallup, N. M.—Blood Pressure Technique Clarified..... 529
JOHN M. CONROY, M.D., and A. T. LAIRD, M.D., Nopeming—Essential Findings in Pulmonary Tuberculosis in Children..... 534
A. E. MARK, M.D., St. Paul—A Study of the Severe Secondary Anemias..... 536
HOWARD R. HARTMAN, M.D., Rochester—Diagnostic and Therapeutic Aspects of Biliary Drainage 545

(Continued on Advertising Page III)

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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association

VOL. V SEPTEMBER 1922 No. 9

ORIGINAL ARTICLES

MOBILIZATION OF JOINTS WITH BONY ANKYLOSIS*

WILLIS C. CAMPBELL, M.D.
Memphis, Tenn.

The mobilization of joints with bony ankylosis is, as yet, an unsolved problem. Little real advance has been made until recent years, for we must depend entirely on our experience as acquired on the human subject, animal experiments being of little value, for active movements and intelligent cooperation are essential to success. In a chronological survey of the subject, one is impressed with the lack of definite data, the report of results being too early and too few to be worthy of consideration. Recently, McAusland has analyzed a large series of elbows, Baer has given his results on various joints, and Henderson has submitted statistics of 43 arthroplasties from the Mayo Clinic and 395 from other surgeons. Arthroplasties of the knee in twenty-four cases, from our records, were discussed in an article before the American Orthopedic Association in 1921 and later published.†

The mobilization of an ankylosed joint may be accomplished by simple excision provided sufficient bone is removed, but such a procedure may render the part weak and unstable. To reconstruct a joint with a wide range of motion and stability that will stand the strain of average daily use, is a far more difficult problem. However, unless such a result can be secured a stiff joint in the most useful position is preferable.

In only selected cases should operative procedures for mobilization of ankylosed joints be considered. The following pathological conditions, encountered in such joints, decrease the chance of success or actually contraindicate surgical measures:

1. Tuberculosis: In no case should a joint be entered for the purpose of mobilization when tuberculosis was the causative agent in the production of ankylosis. Undoubtedly it might be possible to obtain excellent results in some instances, but the probability of "lighting up" a latent tuberculous process is well known and should be sufficient warning against surgical measures.

2. In those in which a destructive osteitis in early life has obliterated the epiphysis, a materially shortened extremity is encountered. Mobilization of such a joint obviously would not be of sufficient advantage to justify the means.

3. Extensive scar tissue, binding the skin to the bone, may render the procedure unsuitable.

4. Extreme muscular atrophy with reorganization of bone structure, as is seen when a bony ankylosis has existed over a long period of time. The medulla may pass through the joint, producing a canalization with rearrangement of the lamellæ. In such an instance, sufficient base would not be found to reconstruct a functional joint; besides, the open medullary canal might be a factor to be considered —and, the muscular apparatus being extremely atrophic, the restoration would be difficult.

5. Old dense eburnated bone, when found for a considerable distance on both sides of the joint, is not favorable soil for reproduction of a movable joint. Such a condition is usually caused by an extensive virulent osteomyelitis, the result of which is low grade bone tissue, which bears the same relation to normal bone that scar tissue does to normal soft tissues. In fact, healthy spongy bone should compose the articular surfaces of the new joint. Consequently, the chance of success is very slight when the structure of the bone has been transformed for one or more inches beneath the joint line.

There are, in reality, only two conditions that cause ankylosis in which open surgical procedures should be employed for the purpose of restoring motion: (1) *traumatism*—crushing of the joint surfaces, tearing of the periosteum, or multiple fractures, followed by bony ankylosis; (2) *acute infectious arthritis* due to staphylococcus, streptococcus, pneumococcus, gonococcus, etc. These organisms erode and disintegrate the cartilages and the superficial bone, unless the infection begins in the shaft, and then we have an extensive osteomyelitis and not a localized arthritis.

*Presented before the Southern Minnesota Medical Association, Rochester, Minn., June 19, 1922.

†Journal of the American Orthopedic Association, Volume 3, No. 9, pp. 430-434, September, 1921.

It is hardly necessary to state that sufficient time should elapse after all acute symptoms have subsided. Children are not suitable subjects, as a rule. The prognosis is better between the ages of 20 and 30, though our oldest case was 50 years of age.

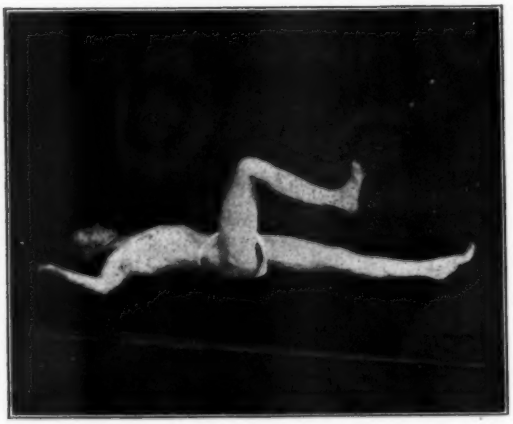
This operation should not be lightly undertaken. The social status, occupation and co-operative intelligence or "grit" of the patient must be duly considered. For instance, a young woman with ankylosis of the elbow at about 160 degrees flexion, with the forearm in pronation, applied for treatment. She was a pianist and in her present state able to pursue her vocation. We declined to do the operation though good function might have been secured, for we could hardly be sure of obtaining the required degree of pronation essential to successful performance on the piano.

All operators usually reproduce, as far as possible, the normal joint; but there seems to be a difference of opinion as to the material to be interposed between the bony surfaces. There are six methods in common use, as practiced by various surgeons:

1. Wide excision of articular surfaces, which usually causes instability and should not be considered.

2. Pedunculated fascial flaps have been extensively employed between the articular surfaces, after remodeling or carving out a new joint.

3. Interposition of animal membranes, specially prepared, as Cargile's, Baer's pig bladder, Allison's fascia, etc., have been used. While success has been reported, the disadvantage is that foreign body irritation invites infection and the material is often extruded.



Flexion of hip six years after operation.

Flexion elbow one year after operation.

4. Transplantation of free fascia lata between the joint surfaces.

5. Transplantation of free fat between the joint surfaces.

6. Mechanical reconstruction of the articular surfaces with removal of sufficient bone to secure mobility without the interposition of any substance.

Recently, we have employed a seventh method in elbows, which has been satisfactory in a limited number, and is described below.

We have operated to restore function in over one hundred joints with bony ankylosis, extending over a period of ten years. There have been many failures, but we have been rewarded by a number of successes, which have progressively increased each year. Practically all have been materially benefited by correction of deformity and placing the member in the most useful position. There have been no deaths or serious consequences.

The technique of arthroplasty or neo-arthrosis differs as do the mechanics of various joints. A reproduction of the joint in detail is not essential; in fact, unnecessarily complicates the procedure. A joint should, however, be constructed to meet the requirements of the normal, and have the same action. To make a new spine, tuberosities, condyles, intercondylar notch, etc., at the knee is of no value except from a cosmetic radiographic standpoint, as no crucial ligaments or semilunar cartilages are forthcoming. We construct one large condyle on the lower extremity of the femur and

Extension of elbow one year after operation.

a shallow cavity on the upper extremity of the tibia.

In the hip joint, a new head and acetabulum is made, however. Sufficient femoral neck must be present if a ball and socket joint is reproduced. A pedunculated fascial flap is easily obtained and in our experience has given the best results.

In the jaw, Henderson has demonstrated that normal function may be obtained by wide excision without the interposition of any membrane or tissues.

The elbow lends itself well to mobilizing operations. Function may be obtained by wide excision, but such joints are weak and unstable. We make an external lateral incision exposing the triceps muscle with its broad aponeurosis which is dissected out, making a long tongue of dense fascia, the fibres of the muscle being incised in the midline to the humerus over the lower third, after which the entire mass is separated from the bone. This gives free access to the joint, which is remodeled, making a convex surface on the lower extremity of the humerus. The surface of the sigmoid cavity and radius is denuded. The muscle fibres of the triceps, with fascia and periosteum, are stitched to the anterior capsule, making a viable flap between the articular surfaces. If for any reason this flap cannot be employed, the tendinous aponeurotic tongue, above described, is placed between the surfaces. No attempt is made to mobilize the radio-ulnar articulation.

In the shoulder joint there is rarely a complete destruction of the articular cartilage on the head of the humerus or through the glenoid cavity, a factor which should be utilized. After incision into the joint, all scar tissue is excised and in some cases the entire capsule. The relation of the joint surfaces are changed by moving the head of the humerus so that normal cartilage will articulate with the glenoid fossa. A fascial flap can be easily interposed if necessary.

In other joints similar principles, as in the hip, knee, elbow and shoulder, have been applied.

The amount of bone to be removed is variable in different joints and also in the same joint in different individuals. In those with lax joints and weak musculature less bone should be excised. Fascial and capsule contractures must also be taken into consideration. When possible, much can be accomplished by conserving articular cartilage, recesses of normal healthy synovial membrane and other structures.

I have interposed all of the materials described, Baer's membrane, pedunculated fascia, muscle, fat, free fascia transplant, and, in some cases, no intervening structure at all. I am convinced that some material should be placed betwen the joint surfaces, not alone from my personal experience in mobilization of ankylosed joints, but because in ununited or delayed union in fractures, fascia, muscle or periosteum have been an evident cause of the formation of pseudo-arthrosis. No structure is suitable for all cases, but when possible a living viable flap should be employed. Traction is used to separate the joint surfaces and prevent pressure necrosis of the intervening membrane.

Flexion hip with knee extended six years after operation.

Flexion six months after luni-arthroplasty.

Extension six months after heuri-arthroplasty.

In bony and fibrous ankylosis, the procedure is the same if there is destruction of the articular cartilage. However, contracture of the peri- and extra-articular structures often taxes one's ingenuity to the limit to accommodate motion. Various plastic arrangements are required and the question of circulation must be studied in detail or tissue sloughing will occur. For instance, if there is a contracture of the quadriceps, motion is not possible unless this structure is elongated.

The after-treatment is begun as soon as there is healing of the wound. This requires the constant surveillance of the surgeon with the aid of an efficient physiotherapeutist. Active motion is encouraged, and passive movements daily increased. An intelligent co-operation on the part of the patient is essential, for, unless voluntary motion is secured within thirty days, there is little chance of success. In lower extremities weight bearing is allowed as soon as tenderness has subsided, which materially aids in restoring function.

It is not feasible in so general a discussion to give a more detailed description of the various procedures relative to each joint, but I desire to impress the importance of considering the joint with all its component parts. If progress is to be

Flexion knee two years after operation.

Extension knee two years after operation.

made we must not alone restore the articular surfaces and synovial membrane, but, also, the capsule, muscles, fascias, bursæ, etc., must again assume a complex synchronous physiological normal action or function. This is not only acquired by a correct anatomical adjustment but also by a system of re-education. If we will bear this in mind and also that such cases should be carefully selected, a distinct advance will be made in this field of surgery.

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RECONSTRUCTION OF TIBIA BY UTILIZATION OF THE FIBULA*

ARTHUR A. LAW, M.D.
Minneapolis, Minn.

It is not extremely unusual to find that the shafts of the long bones are lost or destroyed, in part or as a whole, as the result of osteomyelitis, by the removal of tumors, from battlefield fractures, or in civil practice following severe compound fractures with infection. The tibia shares with the other long bones this liability to the loss of its shaft from the above mentioned etiological factors. In addition, fractures, especially compound fractures of this bone, are more liable to be followed by non-union than fractures of any other bone excepting perhaps the humerus. Because of the weight bearing function of the tibia, if non-union does occur, deformity results and the patient is necessarily crippled.

Much clinical and experimental work has been done in an effort to restore the defects in the shafts

*Presented at the Mid-Summer Meeting of the Southern Minnesota Medical Association, Rochester, Minn., June 20, 1922.

Fig. 1. Case 1. July 25, 1913. Appearance of leg when first seen by us more than two years after accident.

of bones following injury or disease. Nichols[1] discusses in detail the result following conservation of the periosteum in cases of destruction of the shaft as the result of osteomyelitis. He reports two cases where there was nearly complete regeneration of the shaft of the bones at the end of four months; these patients then disappeared so the end results were uncertain. He reports two cases of functional failure at the end of several years, and eleven cases where, there being only a small loss of bone, good functional results were obtained.

This method of conserving the periosteum was and still is of value, yet the more modern method of autogenous bone transplantation has largely superseded the efforts to repair defects in the shafts of bones by the method mentioned by Nichols, by the use of Senn's decalcified bone chips or by an organized clot. The use of the autogenous bone transplant, either as an intramedullary graft or preferably as an inlay, is generally attended by success. We believe 80 per cent of the cases of non-union, or those cases with loss of some substance of the shaft, will be restored by the exhibition of this method. That there are cases, however, which do not respond to this type of treatment, we unfortunately are obliged to admit. It is in this exceptional case then that we must have recourse to some other method of restoring the bone and limb to usefulness.

Fig. 2. Case 1. March 30, 1914. After first bone grafting—inter-medullary graft.

Huntington[2] reports a case where he used the fibula to replace the tibia when the shaft of the latter bone had been lost. His report was followed by a report by Stone,[3] who as well reported a like case of the utilization of the fibula, although his technic varied slightly from that of Huntington. Bond[4] reported two such cases. All four of the cases reported, ultimately obtained good functional results.

Because of the paucity of the literature and the extreme rarity of this condition, and because in the two cases we report bone grafting had failed utterly, I am constrained to report our experience in the transplantation of the fibula to take the place of the loss of the tibia.

Fig. 3. Case 1. June 22, 1915. A year later, showing absorption of graft.

It is worthy of comment that when the fibula is swung over from its normal habitat and mortised below the knee and above the ankle joint into the remains of the defective tibia, while it is in effect an autogenous transplant, instead of receiving its nutrition in its new habitat by osmosis until such time as its new blood supply is re-established (as do all bone grafts), this graft carries with it its own blood supply already permanently established. The fibula as a graft simply suffers the inconvenience of being shifted from its normal position and of being sectioned above and below where it is mortised into the tibia. There is no necessity for this transplant to be osteoconductive, osteogenetic or in any way to change its morphology except to meet the necessity of union where it contacts with the tibia. According to Roux's law we would expect this transplanted bone

to adapt itself to the needs of a weight-sustaining bone and hypertrophy, this hypertrophy being its response to the physiological demands put upon it. As my radiograms will show, this is exactly what happens.

Providing the lower end of the fibula is left so the mortise of the ankle joint is not interfered with, it has become an established surgical fact that the shaft of the fibula can be removed and used elsewhere without in any way interfering with the function of the leg.

Not infrequently infection persists at the site of the non-union of the tibia. When the fibula is sectioned above and below, preliminary to swinging it over to be used as a graft, the points of section are remote from the infected area and may be kept clean. As the shaft swung towards the infected field has its own undisturbed periosteum and blood supply, it is not jeopardized but survives intact, while a free bone graft transplanted into the same area might be lost.

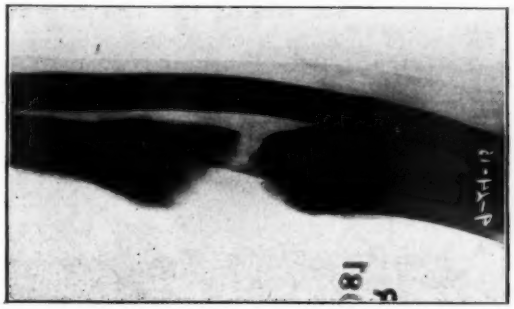

Fig. 4. Case 1. September 24, 1915. Four months later, showing periosteal bridge left from bone graft.

Case 1. M. V., Duluth, Minn. Girl, aged 16.

History: In the winter of 1911, while sliding down hill, she crashed into the sidewalk, severely crushing and lacerating the soft tissues of the left leg and as well receiving a severe compound comminuted fracture of the middle third of the tibia and fibula. There was a loss of four inches of the shaft of the tibia. Five weeks following this fracture she was Lane plated. This plate was later removed. When this girl consulted us on the 24th of July, 1913, she had already been subjected to eighteen operative procedures on this leg under general anesthesia. When admitted to the hospital she had a discharging sinus and non-union of her tibia with tremendously clubbed, enlarged, eburnated ends of the fractured bone. The preliminary operation was done on July 28, 1913, simply to curet out the sinus and remove sequestra. The child was ordered home to Duluth with instructions to report six months after the sinus had healed. This she did, and on the 30th of March, 1914, a six-inch intramedullary bone graft taken from the other tibia was inserted into the site of fracture. The avenue of approach

Fig. 5. Case 1. December 17, 1915. Showing absorption of second bone graft, this time a cortical inlay—also showing the mortising of the lower end of the fibula into the tibia.

was through the posterior part of the calf in an attempt to reach the site of non-union through tissue of better vitality than the dense mass of scar on the front of the leg. This graft healed in without any trouble, yet the major portion of it bridging the defect of the tibia promptly absorbed, without union taking place. Again on May 28, 1915, I inserted a nine-inch inlay graft with periosteum and endosteum, taking the graft from the lower fragment of the tibia. This graft, as well, healed in without infection and it, as well, absorbed, leaving only a small strip of periosteum bridging the defect. We believe the loss of these grafts was due to improper vascularization because of the great amount of scar tissue following her other operations. Six months later (November 12, 1915), as the periosteal bridge showed no tendency to proliferate bone, and as non-union still persisted, we obliquely sectioned the fibula just above the malleolus, cut an oblique mortise in the lower fragment of the tibia, swung the fibula over into this mortise, and put the leg in a cast. On December 29, 1915, the upper end of the fibula was obliquely sectioned and mortised into the proximal fragment of the tibia in the same way and a cast applied reaching above the knee joint. The fibula had united firmly in its new bed when she was discharged.

We have been privileged to examine this case repeatedly since the last operation in 1915 and find the girl walks normally without a limp; the fibula has greatly hypertrophied to meet the weight-bearing demands put upon it. But more interesting still, over the periosteal bridge there has been

Fig. 6. Case 1. February 27, 1916. Showing hypertrophy of fibula and upper end of mortise to tibia. Also showing slight regeneration of bone over periosteal bridge.

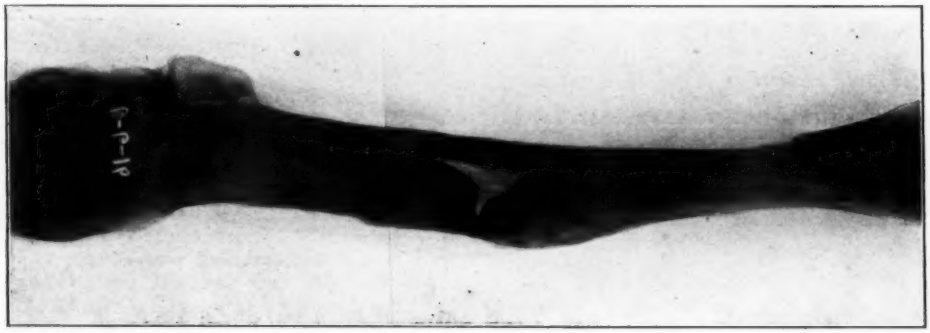

Fig. 7. Case 1. June 6, 1916. Showing whole fibula swung over and mortised into tibia, also further regeneration of bone over periosteal bridge.

a steady gradual building up of bone in the tibial defect until in 1921, as the skiagraph shows, the tibia has entirely repaired itself. From 1911 to 1915, at the hands of various surgeons, this girl had twenty-three surgical operations performed upon her. She now has a normal leg and no shortening.

A case in the practice of Dr. J. A. Johnson, who was good enough to let me see him and give me the history.

Case 2. H. H., Bend, Oregon. Age 25.

History: On November 29, 1912, he fell off a cliff onto the railway tracks and was run over by a construction train, sustaining a severe compound comminuted fracture of the right tibia, with much loss of bone and soft tissue. The tibialis anticus and most of the peroneal muscles with the external popliteal nerve were destroyed.

On July 1, 1913, Dr. John B. Murphy, in Chicago, first removed a sequestrum; then, on October 1, 1913, he did a plastic and swung a pedicled flap of skin over from the left leg to cover the area of tissue loss in the right. On February 16, 1914, Dr. Murphy took a five-inch graft from the left tibia and did an intramedullary graft in the defective right tibia, bridging a three-inch defect. This bone graft did not survive and the non-union persisted.

On October 1, and December 15, 1917, Dr. J. A. Johnson swung the fibula over and mortised it into the defective tibia above and below as I had done in the previous case. The lower mortise united firmly, but the upper fragment of the tibia was markedly osteoporotic, so soft a forceps could be thrust through it. Whether because of this bone condition or because the mortise was so near the knee joint that there was some motion, no union has occurred here.

The fibular transplant has hypertrophied and he gets about with a brace. He writes there is some shortening.

The late *x*-rays of this case show a pocket in the tibia into which the upper end of the fibula projects, there being a false joint at this point.

This man needs further bone grafting to immobilize the transplanted fibula to the upper tibial fragment.

These two cases here reported as well as the four culled from the literature, constitute a small group which I believe proves the value of the fibular transplant when other methods have failed.

Fig. 8. Case 1. September 6, 1917. Showing further hypertrophy of fibula and further regeneration of bone.

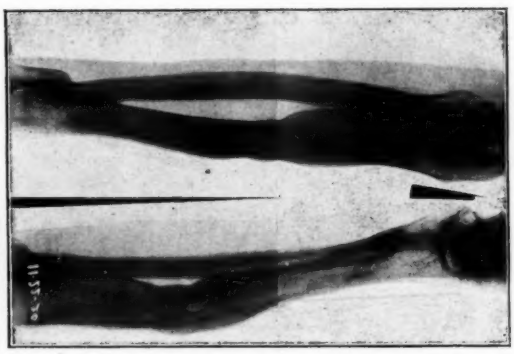

Fig. 9. Case 1. November 22, 1920. Showing hypertrophy of fibula and complete regeneration of tibia.

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DISCUSSION

DR. FRED H. ALBEE, New York City: I congratulate Dr. Law on the excellent results he has obtained in this case; it certainly is most gratifying, and under the conditions it was the wisest procedure to have followed.

Last evening I showed one particular case with the aid of lantern slides—and I have had quite a number of them

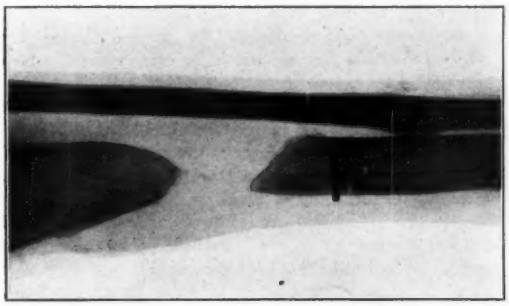

Fig. 10. Case 2. September 15, 1917. Persistent non-union following absorption of bone graft.

—where the intermediary grafts were failures, and where the inlay graft produced the result. In the case of Dr. Law the intermediary graft was put in, and the inlay graft failed. Every time an ununited fracture is operated on and a graft operation is done, or any operation is done and there is non-union, it is just so much more unfavorable at the next operation. I would counsel the use of a very careful technic at the first operation. In this particular case I reported last night there was one short inlay in one fragment and intermediary contact in the other. The inlay healed in, and the intermediary graft did not. It is interesting that the tibia should have united from the fixation and immobilization by the use of the tibial and fibular graft, which allowed bridging to take place. In following our cases of bone grafts we immobilize for a long period. In these cases we should follow the plaster cast and temporary immobilization by properly applied braces.

Dr. Willis C. Campbell, Memphis, Tennessee: I should like to say a few words in regard to this operation. In 1919, at Atlantic City, New Jersey, before the American Orthopedic Association, I reported four cases in which I adopted a similar procedure to that which has been described. In my cases there had been no previous bone grafts. The operation I did consisted of an arthrodesis with removal of the joint between the tibia and fibula, then switching the upper extremity of the fibula in, and at a subsequent operation putting a bone graft across. This operation was done in several cases before I reported it at that time, and it restored the continuity of the limb in a normal way. The other procedure is excellent.

As Dr. Law has mentioned, it is possible to obtain solid bony union by any form of bone graft with a free graft between the tibia and fibula, but on account of the type of dense eburnated bone found in these old cases of osteomyelitis, no graft will be sustained.

Dr. John P. Lord, Omaha, Nebraska: I hesitate to enter into this discussion. My experience, however, has been similar to that of others, but I have had some cases of what were to me real problem cases.

Four years ago I had the case of a child who had a congenital deficiency of the tibia in the central portion. The patient had been operated on five times before I got the case, and in order to bunch these cases, I will say I had another case that was practically similar to the one reported by Dr. Law in which there was loss of the central portion of the tibia from osteomyelitis. Repeated operations were

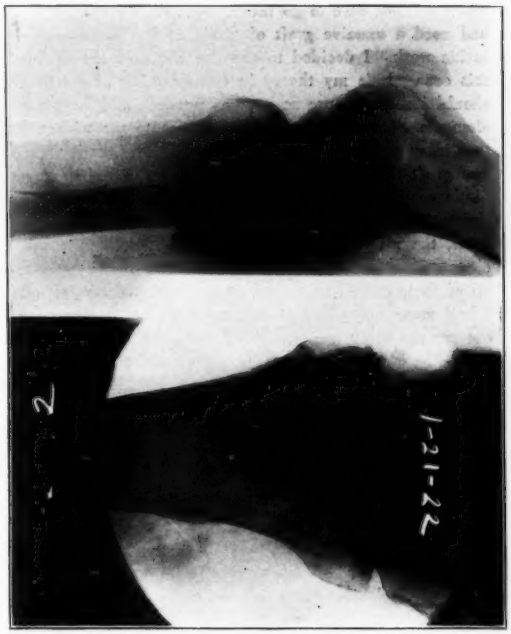

Fig. 11. Case 2. June 29, 1918. Showing mortising of fibula into tibia.

done, so that I had a lot of scar tissue in both cases. Both patients had fractures of the fibula that had occurred secondarily. Still further bunching the cases, I will cite the case of another child about the same age that had an anterior bow-leg, which was operated on by a general surgeon, who had done a double osteotomy. In doing the upper osteotomy he divided the nutrient artery, so that the lower osteotomy wound did not heal. It was followed by pseudarthrosis. There was a lot of absorption, so that when the case came to me it had about one-half inch of actual shortening and atrophy of each end. An *x*-ray picture of this case showed tremendous atrophy of the distal fragments. The atrophy was so great that when these cases were operated on and I went through the tissue, the bone was connective tissue, largely, and could be cut with a scalpel. This indicated to my mind that we had a real problem in getting regeneration between the atrophic fibers of the distal fragments and the graft. These cases had had grafts taken from the opposite tibia in previous operations,

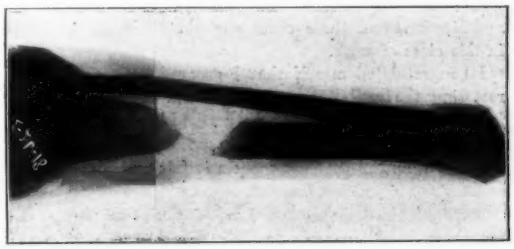

Fig. 12. Case 2. January 21, 1922. Showing false joint between upper ends of tibia and fibula.

and I did not care to go through the tibia for my graft. I had used a massive graft of fibula as Dr. Henderson does in his work. I decided to use the fibula of the mother in this case. It is my theory in transplanting grafts that we should imitate nature as near as possible and have all the elements. One of these patients came to me with a fracture inlay graft that was put in, and the longer it went the less graft there was left. As I said, I decided to use the fibula of the mother, which would pretty nearly represent the normal size of this child's tibia. That would give me the shaft, the medulla, the periosteum and endosteum and all elements for repair in the reconstruction of this case. As all of these cases had five or six operations done previously, I had many difficulties to contend with, but I succeeded in getting the grafts to heal in. I used the Albee method of a double wedge to fill in the pieces of bone. They were sprung into the joint so that there would not be much movement. The two first children were the most active kids I ever saw, and I decided that my failure subsequently was due to the activity of these children, and that I had made a mistake in not properly controlling these children. They had casts on their thighs and part of the time embracing their hips, but they were tumbling around all the time. The difficulty I found was that the longer I went the more absorption I had between my grafts in these atrophic ends of the tibia. These cases left the hospital this spring without result.

My other case was not attended with so much difficulty. I had taken a fragment from the fibula. This child was perfectly docile and I did not have the agitation to contend with that I had in the other children, and profiting by the other experience I suspended this child the way I would in treating a case of fracture of the femur by the old Hamilton method, so that there would be no motion. More than a year and a half elapsed and I did not have union in this case. Repeated study by the *x*-ray showed there was constant absorption going on. I felt my way and finally got to the point where we had a bridge of bone and had the case walking on his plaster cast. Just before I came here last week I saw the patient and the result was perfect.

In the cases I mentioned of the active children I had an extremely difficult proposition and if I had a good fibula in these cases I might have resorted to Dr. Law's method in getting the fibula transferred, but I did not have that difficulty. I think the principle is a good one, and may be used in some of our problem cases, but I believe in children that are repeatedly operated on as my cases were, atrophic as they were and active patients as they were, with the difficulty of keeping the part sufficiently quiet with slender bone, without a carpenter's bit we cannot get absolute immobilization, and these cases constitute difficult problems in this class of work.

I congratulated myself that I succeeded in one case in restoring the medullary canal. In the other cases where I did not succeed in having the graft to heal with the distal fragment, I had restoration of the medullary canal down to that point, but 33 per cent success is fair under the circumstances under which I labored.

DR. A. A. LAW, Minneapolis (closing): One point I did not stress in the paper was this: men are constantly and repeatedly using Lane plates in the presence of non-union. You never get union with a Lane plate when you have eburnated sclerosed bone. General practitioners are the worst offenders in this regard. We have to take out Lane plates constantly that are put in to correct ununited fractures.

I am obliged to Dr. Albee for stressing the fact that the intermediary graft is practically obsolete. If you will notice the dates on the pictures, you will find these grafts were put in at the time when Dr. Murphy was an exponent of the use of these grafts. Since Dr. Albee has called attention to the use of the inlay graft we have used practically nothing else.

I am obliged to Dr. Lord for his description of cases which parallel mine. If Dr. Lord would have groupings made of the blood of the mother and child, I think he would find in the cases in which he got no survival of the graft, they may have belonged to different blood groups. I mentioned that fact before the American Surgical Association two or three years ago. We know that in the transplantation of skin and fascia lata and other tissue which is grafted from one individual to another, if the blood groups are identical the grafts will survive, but if the grafts are not identical they will not grow.

PRIMARY CARCINOMA OF THE APPENDIX*

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Primary carcinoma of the appendix is a topic that has been so much discussed by medical writers of the last quarter of a century that a very voluminous literature has grown up about the subject. Surgeons have reported many cases because of their comparative rarity and because of the characteristics which differ so markedly from carcinoma found elsewhere in the gastrointestinal tract. The topic has also been frequently discussed by pathologists who have used it to emphasize the importance of microscopic examination of all tissues removed at the operating table.

The condition was mentioned as early as 1836 by Merling.[1] Following this, forty cases were reported by different authors, but the first real treatise upon the subject was given in 1903 by Elting,[2] who reported three cases of his own and discussed the other cases of the literature in such an able manner that very little, except additional cases, has been added up to the present time. In 1908, Ralleston and Jones[3] reviewed the literature and found sixty-two cases but considered only forty-two of them entirely authentic. Many of the earlier ones lacked either adequate description or microscopic verification and therefore contributed very little to the

*Presented before the Ramsey County Medical Society, April 24, 1922.

subject. But Harte[4] also in 1908 found 111 cases in the literature to which he added nine of his own, making a total of 120. And, in 1917, Boyer[5] found that 300 cases had been reported.

The apparently increasing occurrence of carcinoma of the appendix has come into prominence with the more frequent microscopic sectioning, particularly the routine examination, of all tissues removed at either the operating or autopsy table. The majority of observers find that in the routine examination of appendices from .33 per cent to .8 per cent show carcinoma. Results of various observers are shown in Table 1:

TABLE 1.

Reimann	17 cases in	13,150 or .12	per cent
McCarthy and McGrath[7]	22 cases in	5,000 or .44	per cent
McCarthy and McGrath[8]	18 cases in	3,039 or .59	per cent
Boyer[5]	4 cases in	1,700 or .23	per cent
Boyer[5] (Protestant Hospital)	0 cases in	300 or .0	per cent
Warwick[9] (Univ. of Minn. Hospital)	0 cases in	300 or .0	per cent
Beldauf[10]	6 cases in	735 or .81	per cent
Elting[2]	2 cases in	320 or .63	per cent
Moschcowitz[11]	6 cases in	2,000 or .3	per cent
Kelly[12]	5 cases in	2,500 or .2	per cent
Miller Hospital	2 cases in	276 or .79	per cent
Total	82 cases in	29,320 or .28	per cent

From this table it appears that approximately .28 per cent of all appendices routinely sectioned as removed show carcinoma to be present. But since unusual cases always seem to appear severally, the statistics will vary markedly from time to time. For example, at the Miller Hospital, where every appendix is sectioned, none was found until December, 1921, when two appeared within six weeks' time. Therefore, the percentage of occurrence varied very markedly within six weeks' time.

One point of interest not emphasized by many of these observers is whether or not carcinoma of the appendix predominates in appendices removed because of actual symptoms, or in appendices removed incidental to operations for other abdominal or pelvic conditions. Although few actual numbers were given upon this subject, one notices upon reading the numerous case reports that in the great majority of cases actual symptoms leading to a diagnosis of appendicitis were present. McCarthy and McGrath[8] found that 31 per cent of their cases of carcinoma of the appendix occurred in appendices removed during operations other than those for simple appendicitis. At the Miller Hospital during the past 15 months 276 appendices have been removed, and of these 167 were operated upon because of symptoms referable to the appendix itself, while 119 were taken out during operations upon other organs. Of the two cases of carcinoma found in our series, one was removed because of symptoms referable to the appendix itself, while the other occurred in an appendix removed during an operation for a retroverted uterus. Therefore, in our small series, in the 161 appendices removed because of appendiceal symptoms, carcinoma was found in one, or .6 per cent, while in the 119 appendices removed during other operations, carcinoma was found in one, or .84 per cent.

Further knowledge on this subject can be obtained from appendices removed at the autopsy table, but only too often the pathologist, failing to detect gross signs of disease, neglects to section the appendix. However, a few statistics from this point of view are available. Kennedy examined 350 appendices removed at autopsies and found but one case, or .28 per cent, of carcinoma. Maydil and Nothgnagel,[14] in a study of 41,838 autopsies, which included 3,585 cases of carcinoma, found only two cases of carcinoma of the appendix. Further detailed studies along this line will be of inestimable value in determining the exact percentage of appendices containing carcinomata.

The age incidence of carcinoma of the appendix is of interest in that it includes the years of early maturity. The greater number of cases show an average of 30 years, which is about 10 years earlier than the average age at which carcinoma appears elsewhere in the body. However, although the average age is 30 years, the condition may appear at any age. For example, McCarthy and McGrath[8] found it in a child of 7 years, and Rogg[15] in a man 81 years old.

The majority of observers find that carcinoma of the appendix predominates in females. At the Mayo Clinic,[8] 73 per cent of the cases were in females. If the condition is a purely accidental finding by means of the microscope (as the majority of investigators contend it to be), this increased incidence in females is undoubtedly due to the fact that because of the great number of pelvic operations with secondary appendectomies, more appendices are removed from females than from males.

The appendix, according to McKenty[16] and Elting,[2] must be considered as a logical site for tumor growths for several reasons. First, it is, in a sense, a fetal remnant or rudimentary organ, and undoubtedly often contains embryonal rests of cells with great potentialities for developing neoplasms.

In the second place, representing as it does a pouch or diverticulum of the digestive tract, it is constantly subjected to a marked bacterial and mechanical irritation, due to the stasis and accumulation of intestinal contents, fecal concretions, and foreign bodies, such as fruit seeds, and we now have come to associate very definitely the presence of chronic irritation and the development of carcinomata. In the third place, it represents a constriction of the gastrointestinal tract, and at the constrictions, such as pylorus, cecum, and sharp flextures, carcinomata occur more frequently than at other points. In the fourth place, it is the frequent site of inflammatory processes which may cause fluctuations in the size and shape of the organ, with the possibility of displacing or stimulating to active growth any embryonal cells that may be present.

The great majority of carcinomata of the appendix appear at or near the tip of the organ. Some authors have suggested that this characteristic may be due to the fact that, in the budding off from the main digestive tract, remaining embryonal cells would most probably be located in the tip. Others think that there is some relationship between the localization of the tumor and the fact that the tip is the frequent site of an inflammatory process, especially of the obliterative type. However, these little tumors may occur at any point in the appendix. Undoubtedly many appear at the proximal end and are often disregarded because of the possibility of their extension from the cecum. Because of the various points at which the tumor may make its appearance, each examination of an appendix should include a splitting of the organ through its entire length and sections made from tip, center, and proximal end, for only by such a procedure can small tumors or foci of infection such as tuberculosis be detected. In Wilkie's[17] case, there were two similar but independent tumors located at different points in the appendix with no connection between them. In some cases the presence of a tumor is suspected upon gross examination because of an enlargement or "bulbous" appearance of the tip, but more often the condition is visible only by the aid of the microscope. In the 22 cases studied at the Mayo Clinic,[18] 5, or about 23 per cent, were large enough to attract attention upon gross examination. In a few rare instances the tumor is large and is seen to penetrate through the appendix, occasionally attaching itself to the surrounding intestinal coils. This behavior is usually that of the colloid or "gelatinous" type.

The microscopic picture of these carcinomata shows epithelial cells of various types arranged in various ways. The most common type is the so-called "spheroidal carcinoma" and consists of nests and masses of epithelial cells surrounded by connective tissue, which may be very small in amount or which may make up the greater part of the tumor. These epithelial cells are embryonic in type and so poorly differentiated that their epithelial derivation is not always certain. Mitotic figures are absent or found in very small numbers and no signs of active or recent growth are evident. The tumor usually underlies the mucosa, but may replace it. The cells infiltrate the muscular coat and in some instances only the serosa remains intact. Because of the masses of epithelial cells infiltrating and invading the various coats, this growth must be classified as a carcinoma, but the lack of mitotic figures and the intact serosa suggest a carcinoma of low grade malignancy, or a tumor which is, at least temporarily, "quiescent."

More rarely, instead of the masses of epithelial cells, there is an attempt at gland formation where perfect or partially developed glands are found in all the layers. But here, as in the "spheroidal" type, no very active signs of proliferation are present and one again has the impression of a very low grade malignancy. Occasionally, from the epithelial cells attempting to form glands, there is a large amount of gelatinous or colloid material. This type occasionally perforates and discharges a large amount of colloid material into the peritoneal cavity, or extends to neighboring coils of intestines or to other abdominal organs, as the ovaries. Very rarely, indeed, is seen yet another type consisting of the embryonic columnar type of cells, which are growing rapidly and are making a poor attempt at gland formation. These are infiltrating the various coats and contain many mitotic figures. Such a picture suggests at once a very malignant process quite analogous to the adeno-carcinoma frequently found elsewhere in the gastrointestinal tract.

It becomes quite apparent, then, that we have two very different types of carcinoma of the appendix: one, the "spheroidal" type, to which the majority belong and which is of doubtful malignancy, stationary as to growths, occurring comparatively early in life, and presenting a different structure from other gastrointestinal carcinomata; the other type, the adeno-carcinomata, which are rare and present a very different appearance from the spheroidal type. These resemble other gastrointestinal

carcinomata and show very obvious malignant characteristics with invasion into the surrounding structures; they occur later in life and may form metastases, thereby proving unmistakably their malignant nature. But the differentiation between the two types is frequently difficult, for, as in every branch of medicine, there are always border-line cases in which a dependable prognosis cannot be made. In such cases it is well to bear in mind that only a very small number will show malignant characteristics.

Almost all of the numerous writers emphasize the fact that carcinoma of the appendix is not malignant, for it usually does not penetrate the serosa, does not metastasize, and is cured by simple removal. In the majority of cases this statement is borne out by the "quiescent" histologic appearance. Because of their behavior, as well as histologic appearance, many authors object to calling them carcinomata at all, suggesting instead such terms as "carcinoid," "benign cancer," or "pseudo-carcinoma." Mallory[17] points out their similarity to moles or nevi of the skin, which contain the same embryonic but quiescent cells, and considers them merely a congenital defect. Ashoff[18] makes a similar observation and calls them "mucous membrane nevi." Others compare them to the epulis of the jaw or to the giant-cell tumors described by Bloodgood, which have a malignant appearance and yet are clinically benign in that they do not metastasize and are cured by removal. However, this similarity is in behavior but not in appearance. Warthin[19] compares them in both appearance and behavior to the so-called basal cell carcinoma or rodent ulcer, which may appear upon the skin of the face comparatively early in life, growing very slowly and not metastasizing. These also contain masses of spindle-shaped, undifferentiated, epithelial cells surrounded by a varying amount of connective tissue and presenting a picture very similar to the "spheroidal" carcinoma of the appendix.

However, while one must admit that the majority of these carcinomata are benign from a clinical and histologic point of view, one must not forget that very malignant carcinomata of the appendix do occur and are described with metastases to other organs. Such cases have been described by Elting,[2] McWilliams,[12] Whipman,[20] White,[21] La Comte,[22] Geist,[23] Brunton and Glover,[24] Berger,[25] and Oberndorfer,[26] who reported two cases. Another case was described by Coley[27] in the discussion of La Comte's case. In 1882, Luce[28] collected twelve cases of malignant appendiceal carcinoma, but of these he considered that in two the diagnosis was open to doubt. In all probability there are many others causing metastasis, but in the latter stages it is very difficult to locate definitely the primary growth, or to determine whether it is in the cecum or the appendix. In such cases where both are involved, since carcinoma of the cecum is a well established entity, the burden of proof lies with the appendix, and since unassailable verification is difficult to obtain, the case is often erroneously classified as primary carcinoma of the cecum. A careful follow-up system of operated cases that have left the hospital, as well as more complete autopsies, would doubtless demonstrate a larger number of malignant carcinomata of the appendix. At any rate, sufficient cases are already reported to make the malignant tumor of the appendix an entity which must be recognized.

It has been suggested by Elting[2] and Kennedy[13] that the apparent absence of metastases in the majority of cases is due to the fact that the neoplasm simulating a foreign body, such as a concretion, produces symptoms leading to the removal of the organ before metastases have had time to occur. While this suggestion must be accepted as a possibility, it seems more reasonable to believe that, in the light of the histologic appearance of the majority of these tumors, they represent such a very low grade malignant process that they rarely metastasize. It is also a recognized fact that these neoplasms, many of them comparatively large, are found in appendices which have never given any symptoms but which have been removed at autopsies or during operations upon other organs. There is every reason to believe, then, that the absence of metastases is due to the inherent qualities of the growth and not to its early removal. This conclusion applies, however, only to the spheroidal type, while the adeno-carcinoma represents a very different problem. Ewing[29] recognizes two distinct types with entirely different manifestations of malignant characteristics.

The question of the etiology of these tumors, as in all neoplasms, has led to the advancement of many theories, none of which has been definitely accepted. The majority of observers attach great significance to the coexisting inflammatory process which is usually found. Luce[28] calls the condition "inflammatory pseudo-carcinoma" and considers it the product of a chronic hyperplastic inflammation with endothelial cells instead of epithelial cells.

Brewer[30] suggests that many so-called carcinomata arise at the site of a former perforation where part of the mucosa has become implanted in the muscle coat and simulates epithelial structures penetrating the muscularis. McKenty[16] suggests that the formation of new connective tissue may cut off and isolate a few epithelial cells which later grow and form a tumor mass. McWilliams[12] and Wilkie[31] feel that there is a possibility of the new growth stimulating the formation of connective tissue, thus making it a secondary process to the tumor formation. Belauf[10] thinks the inflammatory process which is so common in all appendices has nothing whatever to do with the formation of carcinoma, but simply is the cause of the removal of the organ; thus bringing the pre-existing tumor to light. Harte[4] believes that the inflammatory process, by changing the size and shape of the appendix, may dislodge any embryonal nests of cells which may be present and stimulate them to tumor formation.

Letulle and Weinberg[32] pointed out that carcinoma usually arises in an obliterated appendix and in one of their cases were able to show the origin of the carcinoma at the very point where the lumen began to be obliterated. McCarthy and McGrath[7] noted that 90 per cent of the carcinomata were found in obliterated appendices. In their later series[8] a carcinoma was found in each 53 partially, or entirely, obliterated appendices. In our series from the Miller Hospital, 24 of the 276 appendices removed showed a partial or complete obliteration of the lumen, and as two cases of carcinoma were found one occurred in each 24 obliterated appendices. It seems then to be the consensus of opinion among writers that carcinoma of the appendix is usually associated with a chronic, and occasionally an acute, inflammatory process. They also feel that there must be a definite relationship between them because: (1) the carcinoma usually appears at the tip where the inflammatory process is most pronounced; (2) the carcinoma may arise at the point where the inflammation begins; (3) it usually occurs at an age when inflammatory processes are most prevalent, and (4) they are rarely found in autopsies.

Letulle and Weinberg[32] point out the relationship existing between carcinoma and tuberculosis of the appendix. Kelly and Hurdon[33] mention the similarity in the appearance of the two and suggest the possibility of confusion of the two histologic pictures in that the isolated endothelioid cells in the hyperplastic type of tuberculosis might simulate the epithelial cells of the carcinoma. Primrose[34] reported two cases of carcinoma in sisters having tuberculosis. These authors mention the relationship with tuberculosis not to prove an actual histologic relationship, but to emphasize the coexistence of a chronic inflammatory process, of which tuberculosis is an example, with carcinoma of the appendix.

The majority of carcinomata described in the literature were found in appendices removed because of symptoms of appendicitis. In none of the cases was there anything in either the type of symptoms or the history to suggest the presence of a tumor. Several gave a history of very severe attacks, but the greater number presented the symptoms usually associated with the so-called "chronic appendicitis." There was pain and tenderness, often associated with an increased temperature and leucocyte count with intermissions from time to time. In Weir's[35] case the appendix was removed only after the twelfth attack. As was mentioned above, the presence of a tumor was occasionally suspected at the time of operation, but usually it was discovered only by means of the microscope. This disproves the opinion, held alike by many surgeons and pathologists, that a gross examination, even by splitting the organ, is sufficient to determine whether or not a microscopic section should be made. *Every* appendix should be routinely sectioned at base, tip, and center, for only then can many cases of carcinoma and tuberculosis be found; on the other hand, only then can many large, thick-walled appendices be known to be due to, not tuberculosis or carcinomata, but chronic inflammation. Only by such work on the part of the pathologist can the best service be given alike to surgeon and patient.

Figure 1. Gross appearance of Case I and Case II.

The two cases from the Miller Hospital add very little to the subject from either a clinical or laboratory point of view.

Figure 2. Case I. Microscopic section showing gland structure in the submucosa.

Case 1.—No. 3036, a male, aged 34. One month before admission to the hospital he had an attack of abdominal pain and tenderness lasting for three days. Two days before admission he had another attack similar in character but more severe. Rectal examination showed increased tenderness on the right side. Deep pressure elicited tenderness over the region of the appendix. At that time the urine was negative but the white count was 11,000. The *x*-ray diagnosis was "possible ilio-colic adhesion." He was admitted to the Miller Hospital on November 27, 1921, and the appendix removed by Dr. John Rogers on November 28, 1921. It was markedly enlarged with a very much thickened wall surrounding a large lumen filled with mucoid material. Microscopic section showed a normal mucosa but under it were masses of epithelial cells forming glands, some of which were normal in appearance except that they lacked orderly arrangement and were found in the deeper layers, including the muscularis. These aberrant glands were lined by adult, well differentiated epithelium showing no evidence of recent proliferation. In such a case one might well consider the possibility already mentioned of an old healed perforation leading to misplaced gland acini. But under such conditions the glands would not have been so evenly distributed through all sides of the muscularis, and it is difficult to believe that a perforation could have taken place without the knowledge of the patient.

Case 2.—No. 3333, a female, aged 25 years, gave no history of either past or present symptoms referable to the appendix, but consulted Dr. L. W. Barry because of a retroverted uterus with a rectocele and cystocele. She was admitted to the Miller Hospital on January 7, 1922, and on January 8, 1922, was operated upon for the pelvic condition, the appendix being removed at the same time. It was slightly smaller than usual with a distinctly dilated, bulbous tip. Gross section of this showed no lumen, but the entire end consisted of homogeneous, firm, white tissue. Microscopic section showed the only remaining intact coat to be the serosa, while the others were replaced by masses of poorly differentiated, embryonic, atypical, epithelial cells surrounded by a small amount of connective tissue. No mitotic figures were found. This was a typical example of the "spheroidal" type. This tumor was very easily seen upon gross examination and represented a marked enlargement of the tip, yet no symptoms were present. This, then, seems to disprove the theory advanced above that the tumor growth, when reaching a definite size, acts like a foreign body or concretion producing symptoms of appendicitis which prompts the removal of the offending organ before perforation or metastasis might appear. While disproving this theory it strengthens the assumption that there are two definite types of carcinoma of the appendix, one of which is benign.

To summarize these benign tumors, the so-called "spheroidal type" occurs in the years of early maturity before the usual appearance of malignant tumors; these tumors present no distinctive symptoms and show a histologic picture very different from the carcinomata usually found in the other parts of the gastrointestinal tract in that they lack many of the malignant characteristics, such as mitotic figures. Furthermore, the old adage of "The younger the patient the more malignant the tumor" is not applicable here. It also seems probable that the cause for its appearance is no more clear than in those occurring in other parts of the body. Chronic inflammation, while usually present

Figure 3. Microscopic section of Case II showing the typical "spheroidal" appearance.

with the tumor, plays a very unimportant rôle and is simply the cause of the removal of the appendix in which the tumor happens to be located. The finding of such a large number during the earlier years of life merely means that more appendices are removed during that time. It seems very possible that these tumors may remain stationary for years, just as a mole on the skin will, and would be found at any age that the organ might be removed.

However, the frequent appearance of these tumors with their undoubted benign character should not lead to the assumption that true malignant tumors may not also occur at the same site; nor should it lead one to assume that all appendiceal carcinomata are benign. But one must be prepared to meet and recognize two distinct types of carcinomata of the appendix.

This subject can be further clarified by a closer observation of patients after leaving the hospital and a checking of their subsequent health with the microscopic findings obtained. Only by such close observation and by close co-operation between the clinician and pathologist can there be an explanation and elucidation of many of the obscure phases and apparent discrepancies in the science of medicine.

CONCLUSIONS

1. In the routine sectioning of all appendices removed at operation carcinomata are found in from .2 to .8 per cent.

2. Two definite types occur: the spheroidal or benign, and the adenocarcinoma or malignant type.

3. While these two types present a different histologic picture, there are gradations from one to the other, making the differentiation between the two types often impossible.

4. Chronic inflammation, while usually coexistent with the tumor, plays an unimportant rôle as an etiologic factor.

5. Every appendix should be sectioned and when a carcinoma is present the patient's later health should be carefully watched from the viewpoint of the possible apeparance of metastases.

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PROGRESS IN CANCER RESEARCH*

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The idea that the body as a whole rather than its individual cells should be held responsible for the development of cancer, is as old as the hills; it is the biochemical conception of malignancy. Perhaps no other conception in medicine has been quite so often ridiculed, seemingly killed and successfully buried. Few other conceptions have managed as successfully to survive in spite of apparent annihilation from 300 B. C. to 1922 A. D. As a rule, the persistent reappearance of an idea signifies that it embodies some fundamental truth; witness aviation. The old Greeks believed that human beings would fly like birds; Roger Bacon, an English monk, wrote a surprisingly modern description of an aeroplane in 1210; Leonardo da Vinci made a model of a flying machine in the beginning of 1500; and aviation helped to win the war (1914-1918).

Nothing is more interesting than to trace the development and the materialization of an idea through history. Nothing is more readily conceded, more cheerfully forgotten, and less fully realized than the part played by scientific tools in the progress of science. Fundamental principles have always been grasped by the human mind long before they could be demonstrated; but theories remained theories only, until the mechanical devices were available by which they could be transformed into visible or tangible fact. The history of the biochemical conception of malignant growth is no exception to this general rule.

A very brief summary of the development of the biochemical conception of cancer is of practical interest, not only because modern cancer research is progressing along chemical lines, chemistry today being equipped with the apparatus needed for its work, but because there is evidence that chemical considerations will be of real, practical value to cancer patients.

The history of the biochemical conception of malignancy may be divided into four periods. These periods have been named after four supposed causes of cancer, namely, the black bile, the lymph, the blastema, or cancer bud, and diathesis, or metabolic mismanagement. Each period gave rise to delightfully weird and fantastic theories, and to many even more weird and startling methods of treatment.

Period I. The period of the atra bilis (black bile) theories .....300 B. C.-1650 A. D.
Period II. The period of the lymph theories....1650-1800
Period III. The period of the blastema (cancer bud) theories 1800-1850
Period IV. The period of the diathesis (metabolic mismanagement) theories .....1850-19—

During the first period (300 B. C. to 1650 A. D.), the black bile, assumed to be manufactured by the spleen, was universally blamed for the development of tumors, and the tumors were regarded as something foreign to the organism *(praeter naturam)*. A serious difficulty developed, however, after the numerous wars of the fourteenth, fifteenth, and sixteenth centuries had helped to develop the science of anatomy; the black bile could not be found anywhere in the body. The blood, on the other hand, appeared to be everywhere. So, for a time, between 1300 and 1500, the blood was considered to be the cause of cancer, especially when it acquired the somewhat mysterious qualities of "melancholy blood." The physician's chief object was to get rid of this melancholy blood by therapeutic measures such as the "resin of gold" and a preparation of fish-spawn (both prescribed by Paracelsus); the surgeon was told to "be sure and bleed the patient white," when dealing with malignancy. One cannot help imagining the face of a modern surgeon at the bare suggestion. But, if the blood was plentiful and easily observed, it did not yield much information concerning malignant growth. There were neither instruments nor methods with which to study it. Chemistry was still pure alchemy, busily engaged in looking for the elixir of life and the philosopher's stone, which would turn baser metals into gold; it had neither time nor inclination to worry about the peculiarities of melancholy blood. Interest in the blood as a factor in malignancy subsided, became comatose, so to speak; it did not die outright, for during the following centuries prominent men wrote on the subject at intervals.

The second period (1650-1800) deserves the name of, Period of the lymph theories. The blood had proved to be a disappointment as far as the etiology of malignant growth was concerned. The lymph came to be the center of attention through two of the great discoveries of the seventeenth century—the discovery of the circulation by Harvey

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(1628) and of the red blood corpuscles by Malpighi (1661). It was Leeuwenhoek's first, very primitive microscope which disclosed to Malpighi that the blood was not a homogeneous fluid, as it was supposed to be, but that it consisted of cells floating in a colorless liquid, which was referred to as lymph during the seventeenth and eighteenth centuries, and which modern science calls blood serum or plasma. It is an interesting coincidence that the microscope, the instrument which revealed the smallest anatomical units known at that time, came from Holland, one of the smallest countries in the world.

The lymph, being a new discovery, was immediately accused of causing cancer, and three theories were developed in the attempt to prove it guilty. These theories were formulated by eminent scientists in three countris — by Descartes in France, Hunter in England, and Lobstein in Germany. Each theory represents a new phase in the evolution of the biochemical conception of malignancy.

Descartes (1590-1682), the originator of the first lymph theory, assumed the lymph to be a liquid that merely happened to be in the body, but of which the chemical properties, acidity, alkalinity, fermentation, and coagulation are important. Hunter (1728-1793), whose name is associated with the second lymph theory, realized that the lymph is an integral part of the blood and he studied the physical factors by which the quality of the lymph might be altered. The scientific vision of Hunter, to whom the cellular structure of tissues was unknown, is shown by his definition of malignancy: "Tumors are formed by the activities of the organism in which they develop, they are comparable to normal tissues, they live and grow through being nourished by the body itself";[17] a modern pathologist, equipped with a Zeiss microscope, histologic staining methods, and a knowledge of biochemistry could not have given a more accurate definition. Lobstein (— -1840), after whom the third lymph theory has been named, was a professor of Strassburg University and a profligate genius; his morals were such as to offend even his contemporaries during the very broad-minded eighteenth century; he was banished and died in poverty in New York. His theory suggests that the lymph has "formative properties," being composed of "plastic molecules," and connects its physiologic activities with the formation of the blood clot, which he regarded as the first stage of malignancy, the cancer bud or blastema.

The therapeutic measures employed against malignancy from 1600 to 1800 range from medieval blood-letting to surprisingly advanced surgery; from the intelligent use of cautery and caustics to the application of the famous "red paste," composed of unsalted butter, gentian root, red bolus, white wax, frogs' eggs and "white vitriol" (1764). Violent purgatives played a prominent part, of course, but dietary measures, which might be called almost modern, were also advocated. Two remedies, which gained great popularity, were so startling as to deserve special mention—the daily intake of soap emulsified in milk (Dupre de l'Isle, 1774), and the ingestion of live lizards, recommended by Gourlay. A special variety of gray lizard alone was considered beneficial. The heads and the tails of the reptiles were cut off and the bodies had to be swallowed "still squirming." Recamier (1756-1856), an eminent French physician and an excellent observer, reports good results from this treatment. Bayle and Cayol, however, who made the official report on cancer for the University of Paris, failed to observe any improvement, even after one unfortunate patient had been made to devour as many as 400 lizards. The official report is dated 1810. A century later (1912), a substance called bufonin was isolated from the skins of toads and lizards; it has digitalis-like properties. The beneficial effects of the lizard diet, when any occurred, may therefore be connected with a cathartic action and perhaps with an activation of certain metabolic functions in patients whose bodies were still capable of responding; for rises of temperature, diarrhea, vomiting, and sweating were the symptoms obtained by Baldini, who tried the remedy on himself.

During the third period (1800-1850), the period of the blastema, three important factors co-operated to bring about the apparently final defeat of the biochemical conception of malignant growth, namely, Chevalier's achromatic microscope, by which the cellular structure of plant and animal tissues was revealed; the discovery of histologic staining methods making visible undreamt of details in the cell and its nucleus; and the birth of cellular pathology. As cellular pathology was equipped with the instruments by which its contentions could be demonstrated, it dominated cancer research well nigh until the present day. The defenders of the biochemical conception of cancer had no means as yet by which their theories could be crystallized into proof; their ideas failed to carry conviction.

The study of the lymph had done little to solve the problem of malignant growth; but it had called attention to the blood clot. Improved methods of investigation proved that in malignant conditions coagulated blood often contains tumor cells; small wonder if the blood clot was acclaimed to be the "cancer bud," the primary etiologic factor in malignancy. Even Virchow defended this conception as late as 1847, after finding malignant thrombi in the iliac veins of patients with carcinoma.

The history of the fourth period (1850 to the present day), the period of the diathesis theories, shows that the eradication of the biochemical conception of cancer by the progress of cellular pathology was not as complete as it was thought to be at first. The term diathesis is used in connection with this era of cancer research in its broadest acceptation, as synonymous with metabolic disturbances or faulty body chemistry. The theories dealing with diathesis, in this acceptation, are so numerous that it would be impossible even to mention them all in a brief survey; they embrace everything in creation, from tomatoes to combustion products, from racial characteristics to the ingestion of shellfish, from climatic conditions to industrial poisons, from the lack or the excess of sodium chlorid in the food to the influence of heredity, from the consumption of meat or cider to the influence of trees, the water, or the soil. Not a few of these theories have been the object of extensive investigations by recognized authorities in all countries, only to sink into complete oblivion. They may be classified conveniently under the following seven headings: predisposition, specific cancer toxins, enzyme activity, composition of the diet, specific chemical factors, chemistry of the blood, and anomalies of endocrine function.

Modern research, especially the work of Slye in Chicago, on the effect of selective breeding in mice, shows that predisposition is but another name for the heredity factor, of which the influence is tacitly admitted today by the registration of pedigree stock. The specific cancer toxins have proved to be as elusive as the black bile. The influence of enzymes on malignant growth may prove to be a factor of importance, as shown by the recent investigations of Falk. The composition of the diet promises to be of practical importance and capable of benefiting the cancer patient. The influence of specific chemical factors (anilin, arsenic, coal derivatives, benzol and others),[5, 6, 10, 11] the chemistry of the blood, and endocrine anomalies represent an immense field of research, still largely unexplored, but in which the key to the cancer problem will doubtless be found.

The importance of the chemical composition of the blood can hardly be questioned if it is recalled that the life of every cell in the body depends on the blood supply. The blood is practically the only food to which the cells have access, and the quality of the food is likely to affect the cells at least as much as it does the temper of human beings; a good dinner is known to put everybody in an amiable frame of mind, a bad dinner has the opposite effect, as a rule.

The practical value of blood chemistry is illustrated by the recent investigations of Killian and Kast, at the New York Postgraduate Medical School and Hospital; they found a surprisingly early increase of uric acid in the blood in malignant conditions. It was proved that neither the age of the patient nor the reabsorption of tumor proteins explained the high uric acid values; for removal of the tumor does not reduce the values when the prognosis is unfavorable and the blood of a young woman with a rapidly growing cancer of the breast had a very high uric acid content, although the patient showed none of the symptoms that suggest lesions of the kidney, such as albuminuria, retinitis or a high blood-pressure. Killian and Kast rightly conclude that the high uric acid content of the blood is evidence that the kidneys are being overworked, presumably in their attempt to eliminate the products of fundamental, though unknown, metabolic disturbances. Under these conditions, it is obvious that measures calculated to lighten the task of the kidneys will improve the fighting chances of the patient.

A recent editorial in the Journal of the American Medical Association calls attention to the importance of cholesterol metabolism. Cholesterol is one of the blood lipoids, found in every type of blood. In malignancy, the blood cholesterol values tend to be high and there is also other evidence of a mismanagement of cholesterol metabolism.[9] The test for cholesterol is not a diagnostic test, but its technic is simple, although the interpretation of the findings is not always easy, as many factors have to be taken into account. The determination of uric acid in the blood is a more complicated chemical procedure; an admirable test for early renal insufficiency was published later by Magath.

The busy practitioner, however, has neither time nor equipment for the study of blood chemistry,

as a rule and laboratories are not always within reach. Nevertheless, he too has means at his disposal to assist an overburdened kidney. There are many time-honored and valuable measures by which renal function can be supported, measures which are not necessarily drastic, but based on common sense and applicable everywhere, such as reduction of the intake of meat, an increase of the liquid intake, especially in the form of milk,* a largely vegetarian diet with plenty of cooked or raw fruit, and careful attention to the daily, complete evacuation of the colon, for which simple water enemas and Nujol (liquid petrolatum) are useful. Such measures, moreover, are well calculated to facilitate the task of both cholesterol and uric acid metabolism. It is possible to reduce the cholesterol content of the blood by regulating the diet as I have shown.[8] Eggs have a very high cholesterol value and should be used only occasionally. Oatmeal (porridge) appears to increase the cholesterol value for reasons that are not fully explained; it is safe to avoid it or to limit its intake. The value of dietary measures in gout, in which an excess of uric acid plays so prominent a part, is too well known to require comment. The slogan of modern cancer research is likely to become "To benefit the patient, help the kidney."

There is another fact to which I want to call your attention; it represents a message of good cheer for our cancer patients. Rohdenburg's data in the American Journal of Cancer Research prove that in at least 100 well-authenticated, inoperable, and apparently hopeless cases of cancer (microscopic diagnosis), spontaneous and complete regression of the tumors occurred. The patients became clinically well, although none of them had been treated by radiotherapy. One of these patients, a man with a large carcinoma involving the tongue, the tonsils, and the palate, was sent home with the doctor's blessing and a mouthwash. No mouthwash ever cured a cancer, yet examination eighteen months later proved that the tumor had completely disappeared, and the man felt well.

A statistical study with clinical data and histologic findings on 200 resected portions of the stomach by MacCarty and Mahle, furnishes evidence that in gastric cancer 6 per cent of the patients "without glandular involvement lived over ten years" and 1 per cent even for "thirteen years after operation." Two patients in this series, one of whom (2811, Group 2) had "some glandular involvement" and another (9723, Group 3) in whom "all the glands were involved," had lived for thirteen years when the statistics were compiled (1921).

In a recent issue of the Medical Record, Bell, superintendent of cancer research at the Battersea General Hospital in London, who was an "operating surgeon for fifteen years" and whose observations on malignancy cover a period of twenty-seven years, gives very interesting details concerning four patients, all of whom suffered from apparently hopeless, malignant conditions. These patients also became clinically well and able to carry on their work. Bell regulated their diet, prescribed water enemas, and gave such organotherapy as seemed indicated.

Facts like these are proof positive that the human body can hold its own against malignant disease to an extent which is not generally appreciated. If some of these patients won the battle against overwhelming odds, as shown by Rohdenburg's data, many more might be able to do so with the right kind of assistance. From the patient's point of view, "being clinically well" is the chief consideration. How these patients got well is for modern cancer research to discover. The problem will be solved by chemical investigation, because it is a chemical problem and because chemistry today is equipped with instruments and methods as it never was before.

Early diagnosis and early treatment, needless to say, are of primary importance. It will not harm any patient, however, to facilitate the chemical tasks of his body by regulating his diet, either before or after operation or when operation proves to be impossible. Nor will any harm result from telling the victims of malignant disease that at least one hundred fellow sufferers, who apparently had no chance of recovery, have managed "to fool their doctors by getting well," and that they have just as good a chance to "go and do likewise." On the contrary, if psychic impressions influence the body chemistry, as we know they do (the work of Carlson shows, for example, that fright inhibits digestion, and we are all familiar with the type of indigestion produced by bad news received after a hearty meal), then mentioning the foregoing facts will certainly not lessen a patient's chances and may possibly better them.

*For patients who do not like or cannot handle milk, Ovaltine (Wander Company, Chicago) is a useful substitute. It is a kind of "glorified" malted milk with a high nutritive value, flavored with cocoa, containing egg-lecithin, but no cholesterol, as I proved by determination. It is not expensive, easily prepared and keeps indefinitely.

SUMMARY

1. The history of cancer research shows that the formerly much derided biochemical conception of malignant growth has not only survived through twenty-four centuries, but that it is gaining ground today because instruments and methods for chemical investigations are available.

2. The practical value of researches along chemical lines in malignancy has been demonstrated by recent investigations.

3. The complexity of metabolic functions and the number of organs concerned in their regulation make it seem improbable that any single cause of or cure for malignancy is likely to be discovered.

4. The very multiplicity of the factors underlying malignant growth warrants, however, that the consideration of all factors which tend to disturb metabolic processes in the body, that is, chemical processes, will prove of benefit to the victim of malignant disease.

5. The complete and spontaneous regression of inoperable, malignant tumors in 100 well-authenticated cases is conclusive evidence that the human body can wage a winning fight against malignancy.

6. The knowledge that other patients have become clinically well, although the odds seemed entirely against them, can do no harm to any patient suffering from a malignant condition and may prove beneficial to him.

7. Early diagnosis and early treatment of malignancy are of primary importance, but the regulation of the diet is of value, also, because it facilitates the chemical tasks of the body.

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NON-SURGICAL DRAINAGE OF THE BILIARY TRACT: A FEW CLINICAL EXPERIENCES*

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Since Meltzer[1] wrote his little footnote in 1917 describing the action of magnesium sulphate on the duodenobiliary reflex, and suggested a therapeutic and diagnostic application, many prominent clinicians have utilized this procedure as an aid in diagnosis and treatment. Einhorn[2] invented the duodenal tube and was one of the first to analyze duodenal secretion. Rehfuss[3] modified and improved the duodenal tube. Lyon[4] developed a method of procedure, the technique of which is generally followed by other investigators and clinicians. Lyon and Smithies[5] are enthusiastic supporters of the A, B, C bile segregation as indicating definite portions of the biliary tract drained. White,[6] Cheney,[7] Crohn, Reiss and Radin[8] and others, have been skeptical as to the source of the B bile and the conclusions drawn from its analysis.

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Thus a spirit of honest investigation has been stimulated among clinicians and workers in research.

During the past two years, 240 drainages have been performed at the Mankato Clinic. This series was done on over 100 patients. Twenty-five of these cases came to operation or had been operated previous to drainage. Forty other cases had clinical symptoms of biliary tract disease. Six were diabetics. Four cases had acute infectious jaundice. The others were drained in the course of general examination and treatment for various diseases.

METHOD OF PROCEDURE

The method described by Lyon was followed in the main. The passing of the duodenal tube is a simple procedure, if properly carried out. In over 80 per cent of our cases, the tube was passed into the duodenum in an hour or less. The careful and time-consuming preliminary cleansing of mouth, pharynx, and stomach is, in our opinion, futile. A short washing of the mouth with alkaline antiseptic solution, a brief lavage of the stomach after the fastening contents have been aspirated, and a sterile duodenal tube is all that is necessary in the preliminary steps. The accessory sinuses, the mouth and teeth, the folds of the mucous membrane of the esophagus and stomach can never be completely freed from their secretions and flora by any amount of washing. For the proper performance of the drainage there should always be a preceding complete twelve-hour fast, otherwise food débris and interrupted physiological functions of the tract studied will interfere with proper interpretation of findings.

FACTORS WHICH INTERFERE WITH FINDINGS

If the biliary tract secretion alone could be secured, the study of the bile would be simplified greatly. Unfortunately, this is not the situation. Bacteria, mucus, pus, blood, and cells are carried into the stomach, and consequently into the duodenum, from the entire respiratory tract and the accessory sinuses. In the stomach itself, hyperperistalsis, hypersecretion, hyperacidity, and the opposite conditions greatly modify the quantity and character of the fluid aspirated from the duodenum. Infection of the stomach wall itself must be considered. In the so-called "bilious" cases, there is often an active reverse peristalsis of the duodenum and proximal portion of the jejunum with regurgitation of secretions into the stomach. We have actually observed this phenomenon under the fluoroscope, by injecting a small quantity of barium through the tube with the bulb in the last part of the duodenum or the first part of the jejunum.

In one case of complete obstruction of the common duct by a calculus, found at operation, we secured as much secretion from the duodenum as if the bile were flowing freely. The flow of pancreatic secretion is another disturbing factor. All these things must be kept in mind when analysis of the duodenal aspirate is made. For this reason, in studying our cases, we have examined the fasting stomach content and tabulated the findings parallel to, and in the same way as, the duodenal examination. There is, of course, the usual titration for acidity of the stomach content, and we have included that factor in the comparison. Time and rather inadequate facilities have prevented us from making bacterial cultures in many cases. Those studied show such a preponderance of bacillus coli that further examinations were abandoned. Undoubtedly, cultural methods should be employed before proper interpretation can be fully given.

DIAGNOSTIC AND THERAPEUTIC RESULTS

In making this report on diagnosis, we shall take only some cases which came to operation. Comparison will be made between the findings in the fasting stomach content and the aspirated bile, as to mucus, pus cells, blood, and bacteria. An increase of these factors in the duodenal aspirate has, in our estimation, a definite significance. The type and number of crystals have also been observed.

In eight cases of cholelithiasis, five had increase in mucus; four, increase in pus cells; one, increase in blood cells; six, increase in bacteria, most of them with additional kind of bacteria as compared with those found in the stomach content. Four cases showed cholesterin crystals. One case showed calcium phosphate crystals. Six cases had dark B bile. Two had foul smelling, thick, purulent bile. Six cases had had biliary colic. The fasting stomach content in seven cases showed the presence of free HCl, ranging from 12 to 28; all cases showed total acidity ranging from 18 to 55. Three cases had jaundice. It is interesting to note that the cholelithiasis cases showed a much higher gastric acidity than the cholecystitis cases. Only about 50 per cent of the above cases showed definite evidence of biliary tract disease in the biliary analysis.

In ten cases of cholecystitis, preoperative drainage in six cases showed increase in mucus, nine cases increase in pus cells, two cases showed presence of blood; all ten cases showed a very definite and marked increase in bacteria and variations in kind of bacteria. All cases showed dark, thick, opaque B bile. Only six cases showed precipita-

tion of cholesterin crystals. In the fasting stomach content, eight cases had no free HCl. (The other two cases had very extensive adhesions about the gall-bladder.) One case had no total acidity; the others ranged from 8 to 55. Five cases showed the presence of streptococci in the duodenal aspirate but not in the gastric content. In 100 per cent of this series, definite evidence of biliary tract pathology was revealed by duodenal analysis.

In twelve cases in whom the gall-bladder had been removed, only six produced the dark B bile, and most of these had been operated more than a year previously. All of the cases of diabetes mellitus, except one, showed no free HCl in the gastric secretion and all showed the presence of abundant streptococci. One case of pancreatic diabetes complicating cholelithiasis showed a brilliant and remarkable result following three drainages. The jaundice and glycosuria promptly disappeared and the patient was successfully operated upon for the cholelithiasis.

The clinical cases of biliary tract disease showed varying findings, but most of them corresponded well with the cases of cholecystitis above mentioned. One case of lamblia intestinalis was discovered in the series. There was gastric anacidity and the duodenal fluid was swarming with the flagellate parasites.

Therapeutically, we have found that a great many cases are relieved of their symptoms after from one to five or six drainages. Those in whom there was a recurrence of symptoms following cholecystectomy seem to have gotten the most marked relief. Time and space does not permit us to dwell longer on these cases. The purpose of this paper is to present a few brief facts concerning proven cases of biliary tract disease. One other group of cases should be mentioned and that is the cases of acute infective jaundice. The four cases treated by this method seemed to be much relieved from their symptoms, and the course of the disease shortened.

COMMENTS

From the above findings, we believe that the analysis of the aspirated bile when compared with stomach findings gives very definite evidence of infections of the biliary tract. The claim that it is possible to determine what portion of the tract is diseased seems to us rather far-fetched, and untenable. Our series shows the best diagnostic results in the cholecystitis and cholangitis cases, and rather diappointing results in the cholelithiasis cases. The finding of pus, blood, and abundant bacteria in the aspirated bile only, is undoubtedly of great diagnostic value with regard to general biliary tract infection, and we must be wary in carrying the differentiation any farther. The presence of free HCl in the stomach content seems to have an inhibiting effect on the quantity and character of the duodenal flora. The varying of the quantity of gastric juice secreted and expelled into the duodenum has a great bearing upon the density of the bile in the aspirate. We have found, during a single drainage, the specific gravity vary from 1008 to 1020. This, it would seem, should render an attempt to analyze the bile pigments, as some have attempted to do, a very uncertain and unsatisfactory procedure. It should be noted, also, that negative biliary findings do not always indicate absence of disease in the biliary tract.

As a therapeutic measure, it promises much, and we shall continue its use with much confidence in its beneficial results. It is encouraging to note that such surgeons as Willy Meyer,[9] and such modern works as the Oxford Medicine, dwell upon the great possibilities in this procedure, both from a diagnostic and therapeutic standpoint.

It is hoped that more general practitioners and clinicians associated in small group practice will utilize this method and report their results, as it is thus that the real worth of the procedure may be established. The procedure is fairly simple and is within the ability of any progressive physician.

There is one possibility which has not yet been fully utilized. I have not seen it discussed except in one article, that by Aaron, Beck, and Schneider.[10] It is the test of liver function by means of the intravenous injection of a solution of phenol-tetrachlorphthalein. The test was originally done by Abel and Rowntree,[11] but the collection and examination of feces is such an arduous and unpleasant task that it has not come into any general use. This test could be combined with duodenal drainage and the results very easily and quickly calculated, and thus another valuable test added to our growing list of functional diagnostic tests.

CONCLUSION

1. The Lyon-Meltzer method of duodeno-biliary drainage is of definite diagnostic value in infections of the biliary tract. It is believed that proper comparison should be made with contents of the fasting stomach. Cholecystitis and cholangitis present the clearest diagnostic picture.

2. As a therapeutic measure, it is of distinct value in early stages of biliary tract infections, and postoperative treatment after cholecystectomy.

3. As a diagnostic measure, its possibilities have not been fully developed or revealed. A more general employment of the procedure by the profession at large and a more thorough research by laboratory workers is necessary to establish its proper value.

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OTOLARYNGOLOGY AND THE GENERAL PRACTITIONER*

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Much of the progress that has been made in the science of medicine in recent years has been the result of the work of those who are restricting their practice to more or less circumscribed special fields. The result has been that many of the facts that have in this way been added to our store of knowledge come clothed in more or less technical language that may be anything but elucidating to the man in the practice of general medicine. A knowledge of these facts, however, continues to be of great importance to the general practitioner. To assume that the general practitioner must relegate all work in the special fields to the specialist would logically lead to the retirement of the general physician for the simple reason that all phases of medicine have now become, strictly speaking, fields of work for those who choose to specialize along some particular line. That the elimination of the general practitioner is not the goal towards which we should be working is, I believe, clear to all of us. No less an authority on medical problems than Dr. Frank Billings holds that fully 85 per cent of all physical ailments fall within the scope of work which the general practitioner can and should take care of.

Undergraduate medical teaching is coming more and more to be conducted by men specializing in some particular field. This fact does not, I trust, and, of course, should not mean a tendency in our medical schools to turn out men prepared to be specialists. The one aim of undergraduate medical teaching should continue to be to prepare men for general practice. The relegation of the instruction in the various fields to specialists in these subjects is simply a recognition of the plain fact that the problems in these fields can be better presented by the specialist. The method of conducting undergraduate instruction is undergoing great changes. The old-time arena clinic for presenting operative work, whether this be in the older recognized specialties such as ophthalmology and otolaryngology or what we still term the field of general surgery, is being for the most part replaced by instruction in diagnosis and the discussion of problems encountered in these special fields. The teaching of operative technique should properly form a part of the graduate instruction for those who are preparing to practice in some special field. This applies as much to the field of general surgery as to the older specialties. As a matter of fact, the man who has completed his undergraduate medical course is no more prepared to do general surgery than he should be to handle the technique of operations in the so-called surgical specialties. To teach operative technique in special fields to undergraduate medical students or to graduates of medicine engaged in general practice, men who lack the training in the more difficult and much more important problems of examination and diagnosis, is only preparing men for indiscriminate harmful surgery. It should be remembered that it is a relatively simple matter to teach men the technique of an operation; whereas it is much more difficult to train them to recognize the proper indications for doing the operation.

With these few preliminary remarks, I shall undertake to point out a few of the problems in otolaryngology with which the general practitioner should be conversant. Beginning with the ear, the problems relating to the defects in hearing as well as those concerned with vertigo resulting from disturbances of the vestibular mechanism must be turned over to the care of those trained in the technique of functional testing; that is, to men who are specializing in otology. It is with the problems

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in suppurative disease of the ear, especially, that the general practitioner should be conversant. Cases of acute otitis media often pass unrecognized because there is little or no complaint of the most conspicuous symptom of this malady, namely, earache. This may occur in adults, but it is especially true in children who are either too young to complain of the pain in the ear or not yet old enough to call attention to such symptoms as the sensation of fullness, when this occurs without acute pain. Now, the most important service rendered in the treatment of acute otitis media is the securing of early drainage through an opening in the drum membrane. When this occurs spontaneously, it is usually quite as satisfactory as when the membrane is incised. The important thing is that the drainage be established as early as possible, for it has become a generally recognized fact that delay in establishing the discharge even for a few days is a common cause for disintegration of bone in the mastoid process, necessitating surgical interference.

There are a few facts in connection with an acute mastoiditis that every general practitioner should understand. One is that an involvement of the pneumatic cells of the mastoid process is the rule rather than the exception in cases of acute otitis media. Many of these cases present no characteristic mastoid symptoms when the skiagraph will show the presence of pus in the cells. Another point of great importance is that the recognition of mastoiditis either by means of the skiagraph or by the presence of pain and tenderness over the process is not in itself an indication for surgical interference, especially during the first week of the otitis media. When there is an absence of high temperature or of persisting severe pain, it is much better to refrain from operation, even when it is perfectly clear that a mastoiditis exists, for two reasons: first, in most of these cases the process will heal spontaneously, and second, after a softening of the process takes place, that is, after the lapse of two or three weeks, there is much less likely to develop a postoperative extension requiring subsequent operating, than when the operation is undertaken before an abscess cavity has formed, and the infection has become thoroughly walled off from the neighboring bone. The indication to operate during the first week or two of an otitis media rarely arises.

In cases of chronic suppurative otitis media, the problem of determining when local treatment is called for or when an operation should be recommended is now a very definite one, and the decision is one which every thoroughly trained otologist has no difficulty as a rule in reaching. The fact should always be kept in mind that most cases of chronic suppurative otitis media are practically harmless affairs as far as the risk of a serious complication is concerned. Such cases do not warrant operative treatment. It is the exceptional case in which there lurks the danger of a serious complication, such as extension to the labyrinth, sinus thrombosis, meningitis or brain abscess. How can this diagnosis be made? It hinges on one condition, namely, whether the disease involves only the mucous membranes lining the middle ear cavities or whether there is added to this a bone invading process. It is only in the latter that an indication for operative treatment exists, for the simple reason that it is only in these cases that there is danger of a serious complication. No one is justified in advising radical surgical treatment for the cure of a chronic discharge from the middle ear, when it is clear that the process does not involve the bone. A well-trained otologist has very little difficulty in determining when the process is one that is invading the bone. The diagnosis is based on the character of the discharge, the location of the perforation in the drum membrane and the evidence of a cholesteatoma. An offensive discharge uninfluenced by local cleansing treatment, a marginal perforation occupying the upper posterior segment or the region of Shrapnels' membrane, and evidences of a cholesteatoma all point clearly to a bone-invading disease. Not even all of these cases call for operative treatment, but it is only among this type that cases exist where surgery is justified.

I want to say a few things about nasal conditions. I am of the belief that there is no part of the human body which is being subjected to more unnecessary surgical procedures today than is the nose. The reason for this state of affairs is very clear. Men prepared to do general practice have been in the habit of coming to our clinics in the cities, remaining long enough to get a smattering of knowledge of the technique of a few intra-nasal operations, notably the operation for the correction of anatomical variations in the nasal septum, operations on the turbinal bodies, including operations on the ethmoid labyrinth, but these men are not willing to spend the months and months of careful work necessary to gain an appreciation of the proper indications for these operations. It is because I am witnessing every day the harmful effect of these unnecessary operations, especially on the nose, that

I insist that we have no right to teach internes in our general hospitals or general practitioners the technique of operations in any special field, unless they have spent the time and study necessary for acquiring ability to recognize indications for these operations. Take for example the question of the nasal septum. It is the rule for this structure to be more or less irregular, but it is the exception when this irregularity requires correction. In general, it is only when the deflected septum interferes with nasal respiration to such an extent that the patient himself is conscious of the fact or when the presence of the deflection interferes with the proper drainage of an infected sinus that its correction is called for. The idea that the so-called spurs of the septum cause headache has been shown to be a myth, as has been the idea that an irregularity of the nasal septum has anything to do with middle ear disease.

More harmful than this work on the nasal septum is the unwarranted operations for the relief of imaginary accessory sinus diseases. Too often we see a diagnosis of a supposed obscure accessory sinus disease based on such a symptom as a persisting headache, without any corroboration by the accurate methods of examination known to the well-trained rhinologist. Now, headache is a common symptom of accessory sinus disease, but, as a matter of fact, for every case of headache that is caused by this sort of trouble there are perhaps at least ten cases where a persisting headache has nothing to do with sinus disease. The untrained man who acquired a smattering of technique for a few intranasal operations, but knows little or nothing of the diagnosis of sinus disease, is doing an infinite amount of harm by subjecting patients to unwarranted operations on the nose in the hope of curing headache which is not due to any nasal condition.

I must not close this discussion without referring briefly to the problem of the faucial tonsils. I want to make one exception to the statement just made that the nose is being subjected to more unwarranted surgical procedures than any other part of the human body. This exception is the faucial tonsil. I am convinced that the problem of determining when the tonsils are a menace and should therefore be removed is not so simple as it is generally supposed to be. I should like to close by making a brief statement of what conditions constitute proper indications for the removal of these much abused structures. In the first place, all of us recognize that tonsils which are the seat of recurring attacks of acute inflammation are a sufficient menace to warrant their removal, even though these attacks have produced no serious systemic infection and where between the attacks the tonsil may appear to be quite normal. In the second place, a single attack of acute tonsillitis is hardly a sufficient cause for their removal, unless this attack has been complicated by a more or less serious systemic infection such as an endocarditis, a nephritis, or an attack of rheumatism, or unless the tonsils are left palpably the seat of a persisting infection as evidenced by congestion with enlargement or when the cervical lymphatics are swollen.

A frequent error is made in advising the removal of tonsils supposed to be the seat or a chronic infection and where there is no history of attacks of acute infection. As a matter of fact, distinct evidence of chronic tonsillitis which warrants their removal is not uncommon where the patient gives no history of having had attacks of acute tonsillitis. Tonsils that are red and swollen and especially where the cervical lymphatics are swollen are certainly a menace and should be removed. Tonsils that are not enlarged but from which pus can be expressed are also recognized as a menace, but this is a relatively rare occurrence. It is a common inaccuracy for the ordinary cheesy plugs or a more or less liquefied condition of these plugs so commonly found in the tonsils of adults to be referred to as pus. The significance of such cheesy plugs is quite different from that of the actual presence of pus. Where these cheesy plugs are not causing any local annoyance, I ordinarily leave such tonsils alone unless advised to remove them by the internist because the patient is the victim of a serious systemic infection for which no other focus can be discovered. This brings me to the last point I wish to make. The specialist should assume the responsibility of advising removal of the tonsils only in those cases where the indications are the local findings, when there is a history of repeated attacks of acute tonsillitis, or where the local findings indicate tonsils that clearly constitute a menace. In all other cases where the indication for operation is some systemic infection, the best way to avoid the risk of unnecessary operating is to make a statement of our local findings and allow the internist who has charge of the case to decide whether the situation warrants the advice to remove the tonsils; for, while we are all anxious to do everything that can be done for the patient, we are equally anxious to avoid unnecessary operating.

BLOOD-PRESSURE TECHNIQUE CLARIFIED*

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Blood-pressure is one of the most important diagnostic tests for the surgeon to apply to the patient whom he is about to operate. Many a life has been sacrificed on the operating table due to an unsuspected lesion causing a high blood-pressure. Who can not recall patients of the so-called successful operation, from the operation room standpoint, who died within the next few days, because sufficient tests had not previously been performed? Do you wonder that the surgeon shrugs his shoulders when asked the cause of death by the relatives, when the one dearer to them than life itself dies of such neglect, and answers, "It was from some unknown cause and had to be"? Who has not heard the question asked, "Doctor, what was the cause of Mary's or John's death when you assured us that there was no danger connected with the operation?" Had the surgeon made the proper tests, including the phases of the blood-pressure, he might have prepared the patient to have successfully resisted the operative shock as well as stimulated the defective organs during the post-operative period.

The same applies to every obstetrical case coming to the doctor during the prenatal period. These examinations should not only be made the first time you examine the patient, but at each successive call—at the very least, as often as the urine is examined. The blood-pressure may shoot up within a few hours after the delivery and may be the first sign of a threatened eclampsia—let me impress upon you the importance of taking the blood-pressure, calculating the four phases of the pulse-pressure, with the very first untoward symptoms of the mother during the recovery period. During the past month the author was called into consultation, to see a mother whose blood-pressure and urine were normal prior to confinement, who six hours later had a severe headache and blind flashes before the eyes. Prompt action did not prevent the eclamptic spasms, but it undoubtedly saved the life of the woman.

The internist, in making the thorough physical examination, is in no way excused from making the blood-pressure a routine part of his regular technique. In fact, many up-to-date physicians are taking their sphygmomanometer about with them on their regular calls and are using it as regularly as their thermometer. It has been the custom of the writer, as a surgeon, to use his sphygmomanometer and record all its reading upon his records, for years. It is not sufficient for the doctor to ascertain the systolic pressure, in many respects the least important of the cycle; it is the diastolic pressure that is the reading least affected by the existing agencies causing the high systolic pressure. The pulse-pressure in the cycle is the part requiring the most thorough study and mastery in all its phases. The pulse-pressure is the gauge, to a large extent, of the fitness of the patient to successfully undergo the operation: if you please, it may be called the balance wheel indicating to the internal medicine man the condition of the patient as to whether he will slow or increase the tension with the internal secreting glands' products. The up-to-date physician readily gathers from its data, whether the patient is healthy or diseased.

Those of you who are using the different types of sphygmomanometers regularly will often find those cases where the stethoscope will fail to transmit a satisfactory tone and you will need to palpate the pulse. The author found that a combined use of the stethoscope and one of the fingers greatly assisted in securing the impulse and tone from the first throb of blood passing through the artery as the pressure was sufficiently lowered. Hence, I have named it the combined stethoscopic and digital method. Many of the workers in the T.N.T. plants have relaxed, soft arteries, which make this method especially valuable in securing the four phases of the pulse-pressure. The author strongly urges all to employ this method in their routine general practice as of value in all cases.

In order to make this method clear to all, the routine procedure will be briefly outlined. The Faught, on account of its screw release valve, gives the most satisfactory sustaining of the needle upon steady release, and was the type adopted by the U. S. Army. In my office work I prefer the Mercer sphygmomanometer of the mercury column, thermometer type, on account of its accuracy as compared to the spring type.

In taking the blood-pressure, care should always be taken to have the rubber tube extending from the cuff to the dial back of the olecranon process when

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the arm rests upon the table, as seen in Figure 1, or, better still, passing back of the olecranon around the outside of the arm. Without this care, the arm many times rests upon the tube, and all recording instruments will play back and forth in an erratic manner.

In private practice, the reading should be made not only on one arm but upon both arms when certain questions arise as to differential diagnosis. The patient should be seated, relaxed and perfectly at ease, with the arm resting on the table, being assured that he will experience no discomfort. It is always best to place the cuff on a level with the heart; for, if it is above, it will show a lower reading, and if placed below the heart will show a higher reading. In every case, the author places the stethoscope upon the brachial artery at its bifurcation to form the radial and ulnar arteries. A stethoscope of the Bowles type proves most satisfactory but the upright stethoscope may be employed. The author in all these examinations used the combined stethoscopic and digital method. The index and ring fingers, slightly bent, hold the bowl, while the middle finger extends down straight and rests upon the brachial artery, as in Figure 1. Meanwhile, the right hand pumps the air into the arm cuff (Fig. 1), until the pressure reads 200 mm. hg. Now, with the thumb and first two fingers of the right hand, gradually release the air-pressure. With this method, one gets a double check of the systolic pressure, for with the middle finger one feels the beat of the brachial artery and at the same time the stethoscope conveys to the ears the impulse of the blood overcoming the pressure of the arm cuff. As stated before, this blood will pass through certain arteries in such a feeble manner as to be inaudible, but the finger seldom fails to detect it. This method saves a great deal of annoyance to the physician and at the same time requires the arm of the patient to be compressed but once. Then, when one is examining hundreds of cases in a few hours, accuracy and speed are essential.

During the fall of 1918 and the winter of 1919, the author made hundreds of examinations of trinitrotoluol workers at the Rock Island Arsenal. These examinations at the plant were made weekly on all employes coming in close contact with the explosive T.N.T. and included the taking of the blood-pressure with a Faught pocket apparatus.

The diastolic pressure is not so clearly indicated to the finger on the brachial artery when one does not hear the faint beats of the fourth phase transmitted by the stethoscope, which indicates the end of the pulse-pressure or the diastolic index. Still, with experience, one can detect the same jerky play of the pulse as the eye can detect the jerky play of the hand of the dial. This method is then, too, a valuable double test of the diastolic pressure, though by far more difficult than the ascertaining of the systolic in these inaudible cases.

As far as we have been able to ascertain in the literature and on discussing the matter with leading diagnosticians, this combined method originated with the author. For a good many years, we have occasionally examined patients where the stethoscope failed to transmit the sound and were obliged to resort to the digital examination at the wrist.

In examining the trinitrotoluol workers, we found their blood-pressure reduced, and soft, relaxed and easily compressible vessels. The same is true in those cases which Crile describes as shock, "a temporary depression or collapse of vital forces from physical trauma, in which there is an alteration of blood-pressure due to vasomotor inhibition or exhaustion." In the author's cases, we found in these T.N.T. cases the cardiac weakness so evident, and the cardiac strength so manifest, that we determined to pursue the work with greater accuracy and speed. Therefore, we combined the stethoscopic and digital method, which we found gave precision to the pulse-pressure phases. This will be brought out later on more fully as the author describes the cases examined while under the intoxication of the T.N.T. absorption, as compared to the 500 cases supposedly in normal health and coming from the different walks of life examined by Bertnard Smith in the American Army Aviation Service.

Our combined tabulated reports show that over two thousand examinations were made, but not on that many different cases, as many were examined for over a period of three months. We found on an average normal systolic pressure of 128.6. The T.N.T. worker's blood-pressure rises 10.08 mm. systolic for the first ten days. As the worker becomes affected by the absorption of the poison, his blood-pressure suddenly falls 25.28 mm. below normal by the end of the first 44.79 days, on an average. After this, the worker becomes apparently immune to the poison to a certain extent. The systolic pressure rises slowly until it has increased from its lowest point 21.05 points in 23.05 days, but never reaches its normal so long as the worker is in contact with the explosive.

TABLE 1

Systolic of T.N.T. Worker

Average normal	128.60
Average after 10 days	138.68
Average after 44.79 days	103.32
Average after 67.74 days	124.37

The diastolic pressure of the T.N.T. worker rises 4.05 mm. above normal (86.45 mm.) during the first 6 days and then begins to fall until there is a loss of 16.9 mm. below normal for the next 21.24 days after he begins work; then the diastolic pressure begins to rise and in 58.51 average days it has risen 21.75 mm. above its low mark. This is slightly above its normal. There is a marked diminution of pulse-pressure in a T.N.T. worker from that of a normal worker, while the pulse phases, divided into four different volumes, are markedly different from the normal blood-pressure. After this, the pulse-pressure will be only 20-30 mm., while that of the normal, by Smith's, is 39-44 mm. By pulse-pressure or phase one, two, three, and four is the time between the systolic and diastolic readings.

TABLE 2

Diastolic Readings of the T.N.T. Worker

Average normal	86.45
Average, 6 days	90.50
Average, 21.45 days	69.45
Average, 79.75 days	91.18

The average of these two tables (Tables 1 and 2) gives us the comparison of normal cases and apparently immune cases.

In Table 3, the T.N.T. workers are coming in the second and third lines from hard work and direct contact with the hot pouring kettles, as seen in Figs. 6 and 7. Without the effect of the T.N.T., their blood pressure chart would be higher than Table 5. Table 4 shows the effect of the men lying down as compared to Table 5, where they are standing after running up twenty six-inch steps, but both tables taken from the average of 400 men in normal health and non-toxic surroundings.

Stone,[6] pointing out the value of the diastolic presure in estimating the heart load, adopted the formula PP÷DP with a normal value of 50 per cent.

Goodman and Howell,[2] in auscultatory pressure phases, named the second and third phases as measures of cardiac strength and the first and fourth as the phases of cardiac weakness. They point out that a cardiac strength factor greater than a cardiac weakness factor denotes a competent myocardium, especially if the second phase length equals more than 40 per cent of the entire pulse-pressure length. They determine the normal value of cardiac strength to cardiac weakness, as 55.4 is to 44.4.

Crampton[7] has based the vasomotor efficiency percentage on the fact that the vasomotor tone is increased on changing from the recumbent to the upright position. Hence, the systolic pressure is increased and the pulse rate is either unchanged or slightly increased (as stated by Smith) in condi-

TABLE 3

Composite Table of Normal, Toxic and Immune Cases

Pulse Rate	S.P.	D.P.	P.P.	
81.5	128.60	86.45	42.15	Normal Average
55.8	65.5	45.6	19.9	Toxic T.N.T. Average
66.3	124.37	91.18	33.19	Immune T.N.T. Average

TABLE 4

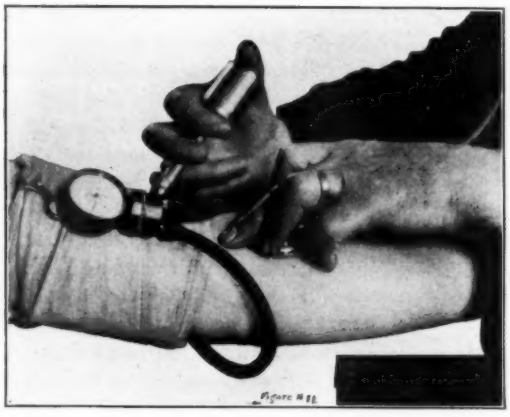
Smith's Readings for 400 Normal Cases

						—Pressure Phases—			
	Age	P.R.	S.P.	D.P.	P.P.	1	2	3	4
Range	19-39	78-94	119-132	80-88	39-44	8-18	20-26	5-10	4-6
Average	24.2	85.4	127.7	84.1	42.2	12.1	24.5	6.2	5.1

TABLE 5

Smith's Readings After Exercise

					—Pressure Phases Length—			Recovery Time
	P.R.	S.P.	D.P.	P.P.	1	2	3	4	Mins.
Range	86-138	128-158	84-96	44-68	8-18	24-49	6-16	6-9	3.1-7.6
Average	112	145.4	90.6	54.1	13	33.5	11	7	4.4



New method of combined digital stethoscope; determination of blood pressure used in T. N. T.

tions of lowered vasomotor tone. In T.N.T. absorption, the systolic pressure remains the same or is decreased on the change of position, and instead of increasing the pulse, as is usually the case, the worker shows a decided cyanosis.

The average number of red cells, among those employed more than three months, was 5,200,000 per cu. mm., with an average hemoglobin percentage of 88.7. In cases at work more than one month, the average number of leucocytes was 10,000 per cu. mm., suggesting a stimulation of the hematopoietic system by the poison.

All of the cases examined were seen immediately after conclusion of their shifts and of the 100 cases, seventy-eight were noticed to be cyanosed; of the seventy-eight, eighteen were markedly cyanosed, and 28 per cent had toxic jaundice. The cause of the jaundice has been taken to be the presence of methemoglobin in the blood. Both toluol and anatol powders give off, at room temperature, small quantities of gas, smelling strongly of nitrous oxide. The crude powder is yellow and presumably overnitrated, since if T.N.T. is washed in water the powder becomes white and the water yellow.

In 20 per cent of the cases, the serum was bile-tinged. This would appear to show that in a high proportion of those cases at work some action of the poison upon the liver was taking place. Captain M. J. Smith, in a résumé of fourteen cases of toxic jaundice, found that thirteen cases showed definite blood changes; but of these only three showed any marked anemia, while Dr. Panton's twenty-eight examples of toxic jaundice showed only four to have definite blood changes, that of aplastic anemia —a destruction of red marrow.

The average weight loss for the T.N.T. workers was 3.03 pounds for the first average 41.94 days, after which the worker begins to gain in weight and in the average 61.74 days following he has gained an average of 5.26 pounds over his normal weight.

Only an average of .23 T.N.T. workers had a skin trouble after the first 30 days, and of the skin trouble .21 was pigmentation of the skin and .02 was jaundice. Our tests show that more trinitrotoluol was absorbed into the system by the air passages than through the skin. The dust and vapors readily reach the alveoli of the lungs, where it readily dissolves or unites chemically with the tisues and enters into the circulation. In the alveoli, the air gives up its oxygen to the system and is replaced by carbon dioxide. We found that a little trinitrotoluol rubbed into the palm would be absorbed through the thick skin so that in a few hours you could analyze it in the urine. If the skin absorbs it so readily, how much more rapidly the air passages. Guarding the air passages with masks and driving off the fumes and dust before it reached the workers, and by having them change their clothing, and bathe under hot showers before going home, we found very little trouble with the workers after the first few days.

The sphygmomanometers proved the most valuable index of the state of their health and with the above technique the most satisfactory records were kept on file of every worker each week.

Bowes,[10] in a series of studies, says that experience has taught us that if all employes who have passed the age of 45 years were examined at regular intervals, the number of accidents would be greatly reduced. This is especially the case since liability acts went into effect. Nearly all the life insurance companies require both systolic and diastolic readings in their examinations. These reports often alone indicate nothing, unless compared with other objective and subjective symptoms. Often a person will pass a satisfactory physical examination until the blood-pressure is taken. Then, by carefully studying the case, something will develop after weeks. Assisted by the laboratory tests, the etiology will develop and sometimes with startling rapidity and a severe degree of acuteness.

Polak[12] sets forth the advantage of a complete record of kidney functions and blood-pressure in every case before deciding to operate. The pulse-pressure is the test of the muscular strength of the

heart, when endocardial lesions can be excluded. This pressure should be one to three as compared to the systolic pressure.

Hypertension, according to Riesman,[13] occurs in great frequency with woman patients over 45 years of age, the greater number occurring between 50 and 60 years. They are constipated and suffer from intestinal indigestion. In most instances, the heart is enlarged, chiefly on the left. In these cases, the blood-presure of pregnant women, as observed by Danforth in a series of 115 cases, showed the average less than that of the non-pregnant. Labor cases, in many instances, show a rise of arterial tension. In toxemia, a rise of blood-pressure is found, except in rare instances. In the different classes of cases of arteriosclerosis, a great diversity of opinion arises as to causes and findings. In no other class of cases does one need to use such great care in matter of technique. To illustrate, the author was called to a lumberman who was an active golf player, who dropped dead on the links. The cause of the death was pronounced arteriosclerosis of the coronary artery. Due to a large life insurance carried by the patient, we performed an autopsy. The pathologist carefully opened the brain, the arteries of the thorax and the abdomen, then of the limbs, and found no deposits indicating arteriosclerosis; and, turning with a smile, wanted to know what about the diagnosis. We insisted on a careful dissection of all the arteries of the heart, and, true to calculations, there was a sclerosed area of the right coronary artery for one inch in length and in the center of this sclerosed area scarcely a hair would pass through the lumen. This man would have passed a perfect life insurance examination without a careful double blood-pressure test. Another case, not long ago, we saw at autopsy in Thief River Falls, where there was no evidence of sclerosed arteries save in the bifurcation of the left coronary artery, where there was a hard, calcareous deposit obstructing the artery for 2 cm. This man, in his late fifties, had walked from the depot facing a cold wind below zero to the hotel and asked for a chair to rest in, and sank down never to rise again. It is true the coronary, cerebral and splanchnic arteries give a more pronounced regularity of symptoms than other arteries sclerosed over only a small area. In these cases, you note the inequality of the pressure taken on the two sides of the body where one has arteriosclerosis. In doubtful cases, simultaneous observations should be recorded.

The author, in taking a 55-minute flight at Chanute Field with Major R. W. Schroeder, who since made the world's altitude record of nearly forty thousand feet, took the blood-pressure reading at 15 degrees below zero, at an altitude of nine thousand feet and found it to be 116 mm. systolic. Both before the flight and upon landing, the systolic was 120 mm. This flight was made to show that as the resistance of the external pressure on the arteries was lessened the blood-pressure would be lessened, and proved true to calculations. Published claims had been made that the pressure was raised and might reach 200 mm. at certain altitudes. This could only be imagined with the aviator in the first stages of fright, when the whole system might be drawn into a hypertension prior to the state of shock, when the aviator, through fear, has a hypotension. Then there is an anemia of the brain and he practically experiences a partial motor paresis, to such an extent that he is unable to work the shifting levers. At great heights, aviators are forced to carry oxygen tanks and when these give out there is an anemia of the brain, as well as a very low blood-pressure, causing the aviator to lose both consciousness and control of the machine until a lower altitude is reached. Experiments have proven that in hemorrhage the blood-pressure must be higher than normal in order to procure an adequate oxygen supply to the tissues. In this regard, it will be seen that the greater the altitude the less will be the pulse-pressure, the less the percentage of oxygen in the air, while the system is requiring a greater demand for oxygen.

Shop interiors and machinery. View in T. N. T. plant, showing method employed in loading high explosive shells.

CONCLUSIONS

1. Pulse-pressure is more useful and definite as ascertained with the combined digital and stethoscopic method. And there seems to be limitless

values to be worked out of the cardiac muscles and stimuli during the different phases.

2. It evidently appears, as Dana[15] states, that the systolic pressure, while a measure of peripheral resistance and as such the result of a compensatory mechanism, is not, in these cases, the result of permanent changes in the renal capillaries, but is the effect of vasoconstriction; whether this be due to the toxins or the chemical agents circulating in the blood, acting as vasoconstricting substances, or from the vasoconstricting secretions of particular glands of internal secretion, or the result of exterior elements, such as oxygen or relaxation of atmospheric pressure, is not clear.

3. Diastolic pressure is believed to be the safety valve of the cycle, and is least affected by the secretions of the internal glands, toxins, or chemical poisons circulating in the blood stream.

4. Cases may react under different conditions to a change of the blood-pressure without diseased condition of the cardiovascular renal system. Many diseased conditions of the ductless glands may exist for indefinite periods before producing changes in metabolism of the ductless glands, causing hypertension.

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ESSENTIAL FINDINGS IN PULMONARY TUBERCULOSIS IN CHILDREN*

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If we confine the discussion of the subject strictly to the limitations set down in the title announced, we find ourselves restricted to the determination of the presence or absence of the tubercle bacillus in the sputum—the presence of the tubercle bacillus being the only finding in diagnosis which is conclusive in itself.

However, there are many other important evidences, no one final in itself, several of which, taken together, may form the basis of a reasonable opinion. None of these alone can be considered essential, but it is essential to determine whether or not they are present.

They include: (1) exposure to infection, (2) occurrence of predisposing causes, (3) physical signs in the chest, (4) characteristic *x*-ray findings, (5) positive tuberculin reaction, (6) symptoms relating to the chest, (7) constitutional signs and symptoms.

It is assumed that it is unnecessary to repeat at this time the standards for the diagnosis of thoracic tuberculosis in childhood prepared for the National Tuberculosis Association by Committees of the Framingham Health and Tuberculosis Demonstration, inasmuch as these are readily accessible and well known to you all.

A brief examination of the summaries of findings, resulting from the personal observation of 280 children admitted to Nopeming Sanatorium, May 22, 1912, to September, 1921, has seemed to us preferable to a general discussion of the subject.

These cases have been classified as follows:

TABLE I

Classification of 280 cases admitted to Children's Department, Nopeming Sanatorium:

Pulmonary tuberculosis	86
Glandular tuberculosis	87
Bone tuberculosis	32
Eye tuberculosis	5
Meningeal tuberculosis	4
Peritoneal tuberculosis	3
Pleurisy with effusion	2
Suspected tuberculosis	61
	280

In 35 of the cases of suspected tuberculosis, there was a definite history of exposure to tuberculosis in the family. These children were kept under observation in the children's cottage and were not in contact with open cases. Such treatment accords with the recommendation of the Framingham committees that in all cases where there is doubt it is better to make a provisional diagnosis of tuberculosis and give the child the benefit of hygienic measures and prolonged observation, although this does not necessarily mean that the child be sent to a sanatorium.

There were 86 pulmonary cases, 30.7 per cent of the total observed, or, excluding suspects, 39.2 per cent. Park and Krumwiede found 50 pulmonary cases in a series of 543 cases of tuberculosis in children under 16 years of age. Our series includes all under 15 years. It is probable that a larger percentage of pulmonary cases seek admission to a sanatorium than would be found in city practice.

The following observations have reference to the 86 cases in which a diagnosis of pulmonary tuberculosis was made. The average age of these patients with pulmonary disease was twelve years, as contrasted with the average age of all children admitted, nine years.

Evidences of tuberculosis were present as follows:

TABLE II

Findings in 86 cases of pulmonary tuberculosis admitted to Children's Department, Nopeming Sanatorium:

	Cases	Percentage
Exposure to infection	38	42
Physical Signs—		
Incipient lesion	52	60
Moderately advanced	20	24
Far advanced	14	16
Presence of tubercle bacilli	21	24.2
Positive von Pirquet	25	29
Elevation of temperature	81	95
Rapid pulse	81	95
Cough	71	87
Loss of weight	79	91
Hemoptysis	5	7

The family history of these patients showed intimate and unmistakable contact in 38 instances (42 per cent), contact with a tuberculous mother accounting for 60 per cent of the 38. Post-natal infection is influenced not only by intimacy, but by time and age of contact, it being conceded that exposure at the time of birth to a tuberculous parent is more dangerous than exposure to a parent whose manifest disease occurs several years later.

The physical signs presented were those of incipient disease in 52 cases, or 60 per cent; moderately advanced in 20 cases, or 24 per cent; far advanced, 14 cases, or 16 per cent.

The unusual percentage of incipient cases recorded, being much higher than the percentage of incipient cases found in all patients admitted, is perhaps due to the more careful observation to which children are subject in their homes and the growing custom of making early use of the tuberculosis clinic. At the same time, it must be recognized that in some of these cases the altered breath sounds, altered voice and, in some instances, the râles detected and interpreted as signs of an incipient tuberculous lesion in the lungs, may have been due to other causes, and the lesion actually have been extra-pulmonary.

Tubercle bacilli were found in 21 cases, or 24.2 per cent. This low percentage is partly explained by the well-known difficulty experienced in the obtaining of sputum from children for examination. At Nopeming, we are now using pharyngeal swabbing (in some cases, laryngeal as well) as a routine measure in all negative cases. We inject samples of the feces into guinea pigs, using the Alexander method. The results of these tests are not yet available for publication.

The von Pirquet reaction was positive in 25 cases, or 29 per cent; negative in 6 cases, or 7½ per cent; omitted or incompletely recorded in the remainder. Notwithstanding the asserted unreliability of the test in older children, we believe that the test should be studied in all children presenting themselves for examination.

The significance of fever and rapid pulse, even when these are taken in accordance with the standards of The National Association, is not so plain, in children, as to deserve special comment by itself. We found fever and rapid pulse both present in 81 cases—95 per cent of our series.

Cough was present in 71 individuals, 87 per cent of those examined. This symptom, while not pathognomonic of pulmonary tuberculosis, is always of importance, and requires explanation.

The loss of weight, noted in 79 cases, or 91 per cent, was merely of corroborative value in confirming the diagnosis.

Hemoptysis, admittedly infrequent, in children is recorded in 5 cases, or 7 per cent of the cases investigated. Slight hemorrhages occurred in one incipient, two moderately advanced and three far advanced cases.

This summary of our observations leaves us with the feeling that aside from the demonstrated presence of tubercle bacillus, all other signs of pulmonary tuberculosis in children are merely suggestive.

Our failure in finding convincing evidence of pulmonary tuberculosis in cases where we felt sure it was present, has led us to a conviction of the necessity of using every available method for finding the tubercle bacillus. We especially desire to direct your attention to the advisability of having the feces of all suspected cases, in which there is no sputum or negative sputum, tested for the presence of tubercle bacilli by injection into guinea pigs. It is a well-known fact that the feces of most open cases of pulmonary tuberculosis contain tubercle bacilli derived from swallowed sputum.

None of the other signs of pulmonary tuberculosis taken by itself is conclusive. Several of them occurring in the same case render the diagnosis of tuberculosis as probably correct. Such evidence must be weighed in the balance of common sense and time must be allowed for leisurely judgment, a term we have used advisedly as peculiarly applicable to diagnosis in children. The time element in diagnosis does not affect their affairs as it does those of adults; they have no social responsibilities pressing upon them or compelling delay in treatment; no stigma—such as it may be—attaches to them from sanatorium residence; they can well afford the time required for careful observation of the symptoms and signs which aroused suspicion, even though the regime under which this is accomplished may in some cases prevent the onset of manifest disease.

The question of *x*-ray findings we have not discussed, as this phase of the subject is being considered by others, and the number of observations we have as yet been able to make is small.

Acknowledgment should be made of the valuable assistance rendered the writers in the summarizing of the records by Mrs. Bernice B. Conroy.

A STUDY OF THE SEVERE SECONDARY ANEMIAS*

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Secondary anemia is a very interesting condition, largely because of its association with so many different diseases. Its presence in varying degrees of intensity in one and the same disease, often independent of the duration of the latter, adds much to its mystery. The distinction between pernicious anemia and secondary anemia, as generally known, is that in the former the cause is unknown, while in the latter the cause is known. However, in a consideration of anemia one is led to believe that there is still much regarding the etiology of secondary anemia which has not been solved. The absence of anemia in one patient suffering from a certain disease contrasted with the presence of a severe anemia in another person with a similar disease is, as will be brought out in this paper, not an uncommon finding. This leads one to believe that other factors often play a part in the causation of the anemia. The determination of these other factors must of necessity often be speculative. For example, the co-existence of both bleeding and infection in a patient with severe secondary anemia often leads to confusion and doubt as to which factor is the more responsible for the anemia. In other patients with only one obvious cause for the anemia, one cannot help but believe that at times other factors are contributing towards its development.

The question of treatment of secondary anemia, as well as the study of pernicious anemia, will not be taken up in this paper.

It is my intention in this paper to consider only the more common causes of the severe secondary anemias. I shall arbitrarily take a hemoglobin of 30 per cent, considering everything below this as representing a severe secondary anemia. The conditions which may cause a mild secondary anemia are too numerous to mention, and obviously can not be discussed here except to bring out certain points of comparison as to prevalence, and so forth. Out of approximately 1,500 secondary anemias seen at the Mayo Clinic from January, 1918, to August, 1919, 144 presented a hemoglobin of 30 per cent or less. Because of the similarity of the

*Written while a Fellow on the Mayo Foundation.

blood picture in these cases and also to enable the reader to visualize and draw comparisons more readily, I shall, for the most part, present the salient features of the blood picture of the whole series in one discussion, and in the consideration of the different groups or individual causes of the severe secondary anemias I shall refer to certain features of a blood picture as the occasion arises. Because of the large number of conditions considered, an attempt will be made to discuss only those which have a special interest or about which there is a diversity of opinion. The classification given below is not a classification of secondary anemias in general, but is used largely for convenience of description and reference.

GROUP I. ASSOCIATED WITH TUMOR FORMATION

A. Malignant	Cases
1. Cancer of the stomach	26
a. Ulcerating cancer of the stomach with spontaneous hemorrhage	2
2. Malignancy occurring elsewhere	15
a. Colon	5
b. Cancer of the cervix following degenerating cervical polyps	1
c. Sarcoma of the uterus with lues	1
d. Papillary epithelioma of the bladder	1
e. Abdominal and pelvic malignancy	1
f. Old cancer of the breast with metastases	1
g. Hypernephroma of the left adrenal	1
h. Cancer of the cardia	1
i. Probable malignancy of the pancreas	1
j. Tuberculous glands of the neck with melanoepithelioma of the neck	1
k. Carcinomas with positive Wassermann	1
B. Benign	
1. Uterine fibroids or myoma	35
a. Cervical polyps	2
2. Miscellaneous	3
a. Adamantomas of the lower jaw	1
b. Ovarian cyst	1
c. Adenoma of the thyroid	1

GROUP II. ASSOCIATED WITH HEMORRHAGE

1. Hemorrhoids	15
2. Duodenal and gastric ulcers	7
a. Those simulating ulcer	1
3. Uterine bleeding without tumor formation	4
a. Menorrhagia	2
b. Childbirth	1
c. Abortion	1
4. Miscellaneous	2
a. Nasal perforation	1
b. Nosebleeds	1

GROUP III

1. General diseases	18
a. Chronic ulcerative colitis	4
b. Nephritis	6
c. Lues	4
d. Decompensated heart	1
e. Nutritional	1
f. Arthritis deformans	1
g. Exophthalmic goiter?	1
2. Leukemia	
a. Myelogenous leukemia	1
b. Acute lymphatic leukemia	1
3. Parasitic	
a. Malaria	1
b. Bothriocephalus with pernicious anemia	3
4. Unknown causes	4

GROUP IV. INFECTION

1. Chronic sepsis	6
2. Pelvic infection	
a. Ovarian abscess	1
b. Pelvic infection with ovarian abscess	1
c. Purulent endometritis	1

The hemoglobin in 43 of the patients under consideration was 20 per cent or less. None of these presented a hemoglobin of 15 per cent; the lowest hemoglobin, 10 per cent, was observed in 8 patients. Only one patient with cancer of the stomach had a hemoglobin as low as 10 per cent, whereas 5 patients with uterine fibroids or myomas showed a hemoglobin of 10 per cent.

The red blood count was below 2,000,000 in 33 patients. The lowest red count was 900,000, which was present in a patient suffering from chronic nephritis. This was the only count below 1,000,000, the next lowest being 1,060,000, in a patient with gastric and osseous lues. Only one patient with cancer of the stomach presented a red count below 2,000,000, whereas 7 patients with uterine fibroids or myomas had a red count below 2,000,000.

The color index in general varied between 0.3 and 0.6. Two patients presented a color index below 0.3. These were 0.2 and 0.2+ and were observed in patients, one with a history of abortion and the other with uterine fibroids. The highest color index in cancer of the stomach was 0.7 per cent. Ten patients presented a color index of 0.8 or above. Of these, 4 had a color index of 0.9; namely, patients with hypernephroma; cancer of the breast with metastases; lues associated with purpura, tetany, and so forth; and nephritis (?). A patient with gastric and osseous lues had a color index of 1.3, which was the only color index noted above 1. It was felt, however, that this patient had a pernicious anemia.

Seventy-nine of the total 144 patients had a complete blood count made. The differential count in general was not significant. Either slight or moderate anisoleukocytosis and slight or moderate poikilocytosis, usually with slight polychromatophilia, were the common findings. Marked aniso-

leukocytosis was observed in 4 patients, as was marked poikilocytosis in a similar number. The patients presenting the latter findings were in the anemias due to abortion, nephritis, and in two patients in which the anemia was due to unknown causes.

Normoblasts were observed in the blood picture of 22 patients. Only one patient with cancer of the stomach showed the presence of normoblasts. This represents 14 patients on whom complete blood counts were made. Two patients with anemia of unknown origin showed the presence of 28 and 18 normoblasts, respectively, 28 being the greatest number of normoblasts observed. Other fairly high normoblast counts were observed in the patients with a history of abortion and in a patient with nephritis.

Megaloblasts were observed only in 2 patients, namely, the patient with history of abortion and in two patients with anemia due to unknown causes. Slight granular degenerated reds were observed in 4 patients, namely, in a case of hemorrhoids, abortion, nephritis, and in a case of anemia due to unknown origin.

In a consideration of the malignant tumors, one feels that there is as much mystery associated with their tendency to produce anemia as there is in the etiology of the malignancy itself. Why one person should exhibit a profound anemia, and another person with a malignancy similarly located and similarly advanced should exhibit a normal blood picture, is a problem which baffles solution and, at least up to the present, has belonged in the realm of speculation.

Laache, quoted by Ewing, concluded that there is an individual susceptibility to the effects of malignant tumors. Leichtenstein, Patrigeon, quoted by Ewing, and Ewing himself, have observed cases of gastric cancer with increase of hemoglobin to 100 per cent shortly before death. Ewing feels that in some gastric cancers there may be a concentration of the blood, probably from diminished fluid ingesta, which maintains the quality. Ewing further states, "The sources of the anemia of malignant tumors are numerous and complex." Among these he mentions: Hemorrhage, interference with the ingestion of food, the absorption of hemolytic agents from ulcerating and infected surfaces, and from necrosing areas of closed tumors, and so forth. Maragliano, Kullman, Polk and Bard, and many others, quoted by Ewing, have demonstrated the presence of hemolytic properties in the blood of cancer. Elsberg, Weil and Bard, quoted by Ewing, have demonstrated the hemolytic properties of cancerous cells.

As the table shows, by far the greater number of patients with marked secondary anemia resulting from malignancy had their seat of malignancy in the stomach. Naegeli, in speaking of gastric cancer, states that its location plays a very striking influence on the blood picture, and that with metastases in the bone and in those latent cases which do not give any clinical symptoms except the anemia itself, there is a much greater anemia.

Of the 26 patients with cancer of the stomach, 14 were operated on. In a series of approximately 300 patients operated on at the Mayo Clinic for cancer of the stomach, only 46.5 per cent presented a hemoglobin of 30 or less. Approximately 50 per cent of the patients in this series had a hemoglobin above 70 per cent.

It is astonishing how often a patient with cancer of the stomach will present a normal blood picture, even though the cancer is quite advanced. Cabot, quoted by Naegeli, in 72 patients with cancer of the stomach, found the red blood cells about 5,000,000 per c.mm. in 19 patients, and in none of his patients was the blood below 1,000,000 per c.mm. Naegeli also quotes Baradulin finding no patient with a red blood count below 1,000,000 in a series of 81 patients with cancer of the stomach. According to Naegeli, the red blood count goes below 1,000,000 only very occasionally. In our series, no patient presented a red blood count below 1,000,000. This was also true in Osler's series of 59 cases of cancer of the stomach. Clerc and Gy, Engel, Grawitz, Hanot and Gilbert, Hayem and other men, quoted by Naegeli, reported patients with red count below 1,000,000, associated with cancer of the stomach, the lowest count being 400,000, reported by Engel.

Not one of the patients in our series of cancer of the stomach presented a blood picture that could have been confused with the blood picture of a patient with pernicious anemia. It was always that of a typical secondary anemia. The color index, as already noted, averaged between 0.3 and 0.6, and in no patient was it 0.1 or over 1. Oswald Miller, quoted by Naegeli, in 20 patients with cancer of the stomach, found none with a high color index. Naegeli also quotes Conti and Rossi as finding only one color index above 1 in 40 patients, and Baradulin as finding a color index of 1 in 3

patients and above 1 in one patient in a series of 81 patients. Naegeli is inclined to believe that the blood picture is that of a definite secondary anemia and he quotes Hirschfield as finding only typical secondary anemia.

Harrington and Teacher, quoted by Osler, feel that in metastases of bone marrow the blood picture may be that of pernicious anemia. A complete blood count was made on 14 of the 26 patients with cancer of the stomach. As already noted, normoblasts were present in the blood picture of only one of these 14 patients, while megaloblasts were not observed. Conti and Ross, quoted by Naegeli, found normoblasts in only 7 of 40 cases. They observed megaloblasts in only one case. Naegeli feels that normoblasts and megaloblasts are not present in the usual case.

In regard to malignancies in general, a marked anemia should always put us on our guard and every effort should be made to determine the reason for its presence. It is surprising how often an indeterminate secondary anemia, especially when marked and progressive, will turn out to be the result of malignancy. In fact, every now and then the chief symptom and at times the only symptom which malignancy manifests is a progressive anemia. According to W. J. Mayo, "Cancer of the body of the stomach and cancer of the cecum and ascending colon may produce striking anemias early, before there are local symptoms."

Naegeli, in speaking of cancer of the stomach, says that anemia is often the first symptom, and cites two cases where the hemoglobin was 12 and 10 per cent respectively without any other clinical symptoms.

On the other hand, the presence of a normal blood picture should not prejudice one against the possibility of an existing malignancy. This was brought out not only in the stomach series, but also especially forcibly in the cancers of the colon and rectum. Thus the 5 cases of cancer of the colon listed as causes of marked secondary anemia represent the total number with a hemoglobin less than 30 per cent out of approximately 250 patients operated on where the hemoglobin was listed. Of the total number of patients operated on for cancer of the colon at the Mayo Clinic from January, 1918, to August, 1919, about 40 per cent had a hemoglobin of 70 per cent or under, whereas about 60 per cent had a hemoglobin above 70 per cent.

In general, patients having benign tumors either present no evidence of anemia or only a mild degree. However, a very notable exception to this is observed in patients with uterine tumors. These offer a very fruitful source of the anemias and as already observed comprised 35 of the total 144 patients with severe secondary anemia. As a general rule the anemia developing from uterine tumors is a gradual one, the average patient in the group giving a history of profuse flow dating back two or three years. The longest history of profuse flow was nine years, while the shortest was two months. In the latter, however, the patient had flowed constantly. Three patients in the group presented a history of no other symptom than that of acute hemorrhages.

A complete blood count was made on about one-half the patients. As already noted, the blood picture was that of a typical secondary anemia, the color index averaging from 0.3 to 0.5. The lowest hemoglobin observed was 10 per cent. None of the patients presented a red blood count below 1,000,000. Normoblasts were observed in 3 patients with uterine fibroids. Megaloblasts were not noted. Marked anisoleukocytosis and marked poikilocytosis were observed in the blood picture of one patient. The other blood findings were not significant.

When one considers a large group of patients with nonmalignant uterine tumors, one is impressed by the relative infrequency of severe anemias resulting. Thus, in an analysis of several hundred patients who received intrauterine therapy, only from 2 to 3 per cent presented a hemoglobin of 30 per cent or under. Approximately 40 per cent of these patients presented a hemoglobin of above 70 per cent.

It is quite interesting to note that 2 patients presented severe secondary anemia because of cervical polyps. Both of these patients at operation showed the presence of cervical polyps, which diagnosis was confirmed by the pathologist. One should always be suspicious of probably malignant degeneration under the circumstances, and care should be exercised to rule this out. As listed in Group I, one patient developed a marked anemia as a result of cancer of the cervix following degenerating cervical polyps.

The second group represents patients with severe anemia resulting from definite bleeding. Fifteen patients presented a severe anemia as a result of

bleeding hemorrhoids. The blood picture was that of a typical secondary anemia. In most cases, it was perfectly obvious that the hemorrhoids in themselves were the sole cause of the anemia. However, in a few patients the anemia was so marked, and a history of bleeding from the rectum in sufficient quantity or over a long enough period of time elicited with such difficulty, that a diagnosis was arrived at largely through careful elimination.

The recognized prevalence of patients with hemorrhoids and the variability of the latter as to bleeding independent of size, necessitates our relying on what the patient has himself noticed; very often the patient is absolutely unaware of even persistent bleeding and develops a severe anemia before the cause of the latter is ascertained. In general, it may be said that in patients presenting anemia of obscure causation, one should always think of hemorrhoids as a possible source. However, this diagnosis should only be arrived at after a careful exclusion of other possible causes, such as malignancy of the rectum, and so forth.

The blood picture of the patients with either gastric or duodenal ulcer did not present anything unusual. The lowest hemoglobin was 15 per cent in a patient with perforating gastric ulcer. That severe anemia is a rather uncommon finding in patients with duodenal ulcer especially, is quite evident from the relatively few cases of severe anemia listed above as being due to ulcer. In an analysis of betwen 900 and 1,000 patients operated on at the Mayo Clinic for duodenal ulcer, approximately one-half of one per cent had a hemoglobin of 30 per cent or below, and approximately 85 per cent had a hemoglobin above 70 per cent.

At operation, 3 of the 5 patients with severe anemia due to a duodenal ulcer showed the presence of a bleeding ulcer; 2 of the patients gave a history of hematemesis; 84 gave a history of blood in the stools.

Indeterminate gastric hemorrhage was observed in one patient. This patient gave a history of recurring gastric hemorrhages with symptoms suggestive of a duodenal ulcer of nine years' standing. The hemoglobin was 24 per cent. Two fluoroscopic examinations of the stomach and duodenum did not reveal anything abnormal. Because of the suggestive history, and also in order to determine the cause for the hemorrhages, the patient was explored by Dr. C. H. Mayo. The stomach, spleen, liver, and gall-bladder were found to be normal. No pathology was present except a chronic appendicitis.

That a severe anemia may develop in patients with simple menorrhagia with no definite pathology is quite easily understood. Bleeding from other causes, such as childbirth, abortion, nasal perforation, and obscure nosebleeds, may be the cause of a severe anemia developing in a patient. Many other causes might be cited, such as purpura, hemophilia, obscure internal bleeding, and so forth.

Group III represents patients with severe anemia resulting from general diseases. Four patients in this group presented their severe anemia as a result of chronic ulcerative colitis. The lowest hemoglobin in this series of 4 patients was 17 per cent, while the lowest red blood count was 1,920,000. All of these patients gave a history of blood in the stool. In an analysis of 117 patients with chronic ulcerative colitis, Logan found only 4 with a hemoglobin below 30 per cent, 6 with a hemoglobin between 31 and 70 per cent, and 12 with a hemoglobin between 41 and 50 per cent. He also observed that in 15 of the 117 patients the hemoglobin was above 80 per cent.

Nephritis has been generally conceded to be a common cause of anemia. However, when the anemia is severe it is very probable that in most cases other factors are also playing a part in its causation. Thus in one of the patients in this service the trouble dated from an attack of influenza and this, together with marked dental sepsis, were no doubt at least contributory factors. Another patient presented all the signs of a marked nephritis and died while under observation. Necropsy in this case revealed an acute ulcerative endocarditis and marked enlargement of the spleen, besides interstitial and parenchymatous nephritis. Two other patients in the series with definite clinical evidence of nephritis at necropsy showed, apparently as the sole cause of the anemia, interstitial and marked parenchymatous nephritis, respectively.

The lowest hemoglobin was 18 per cent; the lowest red blood count 930,000. The highest color index observed was 0.9 +. In this patient normoblasts numbered 18 and there was marked anisoleukocytosis and poikilocytosis, slight granular degenerated reds, and polychromatophilia.

The rôle played by lues in the causation of the very marked secondary anemias, for example, with hemoglobin below 30 per cent, is an exceedingly minor and infrequent one. Moderate and at times

fairly marked secondary anemias occur in about 15 per cent of patients with secondary lues, according to Stokes. Of the 4 patients whose anemia I have classified under lues, only 2 could unhesitatingly be put in this series. All 4 had positive Wassermanns. One of the patients had hereditary lues with a history of chronic diarrhea, tetany, and purpura. The other patient had gastric and osseous lues, with an hour-glass stomach and marked narrowing. The color index was suggestive of pernicious anemia, being 1.3 on one occasion and 1— on another. The eye grounds were also suggestive of pernicious anemia. The lowest hemoglobin in the series was 16, with a red count of 1,980,000.

Martin, in a study of 25 patients with severe secondary anemia, found 11 due to lues and showing a 4+ Wassermann. These improved under arsenic. He concluded that profound anemias are often associated with lues. The administration of arsenic improves an anemia whether due to lues or not, so that one can not formulate very definite conclusions when improvement follows antiluetic treatment. The fact that patients with other conditions such as a malignant endocarditis, and so forth, will at times give a positive Wassermann, is likely to lead to confusion and tends to ascribe to lues a more prominent etiologic factor than it really plays. Very often the occurrence of a positive Wassermann is merely incidental and has no bearing on the anemia. In the patients with cancer of the stomach already described, two showed the presence of a positive Wassermann. One must, therefore, be very hesitant about coming to the conclusion that lues is the cause of a severe anemia in a patient even though a positive Wassermann is present. Response to antiluetic treatment should also not be considered as conclusive evidence that the anemia in a given patient is due to lues.

Anemia due to nutritional disturbance is fairly common, especially in infants and children. At times the anemia can become quite marked, and under these circumstances one feels that there must be some other basis for the anemia. However, the speedy response to correction of diet, and so forth, makes it quite evident that one is dealing solely with a disturbance of nutrition. One case was of this nature and the patient on discharge had a normal blood picture.

The patients with arthritis deformans and decompensated heart, respectively, did not present an unusual blood picture from the standpoint of severe secondary anemia. The hemoglobin was 30 per cent in the former and 25 in the latter.

One patient with exophthalmic goiter showed a hemoglobin of 30 per cent. A careful search for a cause of this anemia did not reveal anything and it was thought that probably the hyperthyroidism was the etiologic factor. However, it has been our experience that exophthalmic goiter, contrary to the usual belief, is a very uncommon cause of anemia. W. A. Plummer showed that in a series of 578 cases seen at the Mayo Clinic in 1912 and 1913, the hemoglobin was below 70 per cent in only 13 (22 per cent). The lowest hemoglobin in his series was 44 per cent. His results corresponded with those of Kooher.

It has been our experience that although tuberculosis is commonly the cause of a mild secondary anemia, it very seldom causes a marked degree of anemia. This is especially true of pulmonary tuberculosis. In a series of 532 patients operated on at the Mayo Clinic from Jan. 1, 1894, to Jan. 1, 1918, for renal tuberculosis, Braasch found that only 73 had a hemoglobin less than 80 per cent. Eight of these presented a hemoglobin of less than 50. Braasch feels that the reduction in hemoglobin is seldom caused by the loss of blood from hematuria, nor is it in proportion to the duration of symptoms of the bladder; but that the greatest reduction of hemoglobin is noted with extensive renal suppuration when absorption of toxins was evidently the cause.

Stokes found that in 30 cases of tuberculids 25 per cent had a hemoglobin below 53 per cent. The lowest was 30 per cent, but in this patient there was a possibility of its being pernicious anemia.

The patient with myelogenous leukemia presented a hemoglobin of 28 per cent and a red blood count of 2.30. One year previous the hemoglobin had been 58 per cent. A patient with acute lymphatic leukemia gave a two months' history of bleeding from gums and showed the presence of petechial hemorrhages and ecchymoses. At his first examination the color index was 1.1+. Three weeks later it was 0.6+ with a hemoglobin of 20 per cent and a red blood count of 1.63 million. Small lymphocytes represented 96.5 per cent of the 36,200 leukocytes. Two normoblasts were noted as well as slight anisoleukocytosis and poikilocytosis.

Some degree of anemia is practically a constant finding in the leukemias, its extent depending in

the chronic myelogenous and chronic lymphatic cases largely on the duration of the disease. Naegeli states that in the early stages or in light cases of chronic myelogenous leukemia the blood corpuscles are not changed, and that the hemoglobin is also normal. However, with the advance of the disease and cachexia, he states that the anemia becomes severe with the presence of normoblasts, and occasional megalocytes, almost always. He feels that the severe anemias resulting from the acute lymphatic leukemia have a blood picture greatly resembling pernicious anemia. Also, in these cases under septic influence, the severe anemias with normoblasts and megaloblasts he states remind one very closely of pernicious anemia.

Gulland and Goodall, in speaking of lymphatic leukemia, state that anemia is always present and that in the acute cases and particularly in the hemorrhagic forms the anemia may be extreme. He observed one case in which the reds fell from 4,000,000 to 666,000 in ten days. Giffin states that with a definite leukopenia there seems to be much more likelihood of the occurrence of a crisis, with severe anemia and hemorrhage. The anemia may then simulate the primary type, with normoblasts and megaloblasts present. He, therefore, warns us against the injudicious use of radium, as he states that repeated applications of radium once a week for several weeks may initiate a severe anemia with leukopenia.

Parasitic conditions did not offer a very fruitful source of severe secondary anemias in our series. However, our experience concerning anemias of parasitic origin can not be taken as representing a true index of their prevalence owing to the relative infrequency of parasites in this territory. In going over 20 cases in which a diagnosis of malaria had been made, only 8 patients showed the presence of malarial parasites at the time of examination. Only one patient presented a hemoglobin less than 30 per cent; of the remaining 7, none were below 55 per cent. That poor living conditions, and especially poor food, is a big factor in the etiology of anemias occurring in patients with malaria, especially, can not be denied. Bates is convinced that food is the predominant factor in the etiology of all tropical anemias. Mayor Ashford in his work on anemia in Porto Rico also recognized the importance of food.

In four of the patients with severe secondary anemia, no definite cause for its presence could be determined. In 2 of these patients the anemia was quite marked, having 28 and 19 normoblasts, respectively. The blood of these two patients also showed the presence of megaloblasts, and slight granular degeneration of red cells was observed in one of the patients. Marked anisoleukocytosis and marked poikilocytosis were present in both. The highest color index in the 4 patients was 0.7. One of the 2 patients with the very severe anemia was a child eleven months and three weeks of age. Physical examination showed a moderate enlargement of the liver and spleen. The Wassermann test was negative, as was the von Pirquet on two occasions. The child had a slight cough and failed to gain in weight. The possibility of splenic anemia of infancy was considered. A diagnosis of "anemia of unknown cause" should be made only after an exhaustive study has been made. The patient should, if possible, be kept under observation for at least a few weeks and response to treatment determined. Obscure malignancies, pernicious anemia, and so forth, should be repeatedly considered and ruled out only after a plausible explanation for the anemia is arrived at.

ANEMIA DUE TO SEPSIS

A diagnosis of marked secondary anemia due to probable sepsis was made in 7 patients. In none of the patients could a history of bleeding be elicited. An exhaustive study of these patients failed to reveal any other likely cause for the anemia. The presence of *entameba histolytica* was observed in an examination of the stools of one of the patients. However, it has been our experience here to find a severe anemia an extremely rare finding as a result of *entameba histolytica*. The patient's anemia did not improve on instituting treatment for the parasitic condition. On ordinary measures the patient showed marked improvement at the end of six months. One patient presented a malignant endocarditis. Blood culture showed long chained streptococci. The lowest hemoglobin was 25 per cent and the lowest red count 2,180,000. The highest color index was 0.6. In 4 of the patients in which a complete blood count was made the differential count was not unusual and the other findings were those of a moderate secondary anemia. No normoblasts or megaloblasts were observed.

Gulland and Goodall state that in conditions of generalized sepsis or absorption of septic products in such affections as malignant endocarditis or puerpural fever the blood changes are profound.

Reds may fall to 1,000,000. He further states that normoblasts are rare in chronic, but frequent in acute cases. Megaloblasts are absent. The color index rarely is above 0.8, even in the worst cases.

Hunter regards anemias more from the standpoint of their etiology, and their infective or non-infective nature. He feels that in nine out of ten cases of "severe anemia" an infective factor is present; that this is in the nature of a septic infection, usually streptococcal; that the sepsis is formed in the mouth in relation to the teeth, and that the clearing up of the focus either stops or greatly lessens the anemia when the latter is due to other causes.

That foci of infection play an important rôle in the production of anemia no one can dispute. Foci of infection should be eradicated in all patients as a routine. However, the presence of even marked dental sepsis or very septic tonsils in a patient with a severe anemia, should not prejudice us against the possibility of other, probably much more important, factors, the discovery of which are of extreme importance in the ultimate curing or checking of the anemia.

Both the patient with the pelvic infection and the patient with the purulent endometritis gave a history of profuse flow, so that the anemia was probably chiefly the result of this and the infection no doubt played a minor rôle in the causation of the anemia.

One thus sees that many conditions may produce a severe secondary anemia. The conditions listed in this paper represent the more common causes. However, other conditions such as myxedema, hemolytic icterus, Hodgkin's disease, and so forth, are quite often associated with a severe anemia. In an analysis of 17 cases of hemolytic icterus, Giffin found one patient with a hemoglobin of 27 per cent and 4 with a hemoglobin between 30 and 40 per cent. Krumbar, quoted by Balfour, collected 10 cases of hemolytic icterus in which the red blood count was below 1,000,000.

No attempt has been made in this paper to discuss pernicious anemia. The patients studied, for the most part, presented a definite secondary anemia blood picture. The importance of this attaches itself especially to those patients with gastric malignancy in which the blood picture was uniformly that of a secondary anemia. The minor rôle played by lues should not be lost sight of, as well as the very minor rôle played by exophthalmic goiter. Malignancy should always be suspected and ruled out in all obscure severe secondary anemias, but at the same time a normal blood picture should not prejudice one against the possibility of an existing malignancy.

A patient presenting a severe anemia should be studied from every angle, and every possible diagnostic aid, both clinical and laboratory, should be brought into play. These, together with well-seasoned judgment and observation, should be exercised before a final conclusion is arrived at. Repeated special examinations, such as stomach rays, and so forth, should be used in patients with obscure anemia.

Too much importance should not be ascribed to infection from the standpoint of its being the sole cause. Other causes should first be sought and eliminated, and foci of infection cleared up on general principles.

A diagnosis of indeterminate anemia is a hazardous one, to say the least, and should only be made as a last resort. Then the patient should be examined from time to time and every effort made to rule out pernicious anemia and malignancy.

SUMMARY

1. In a series of 1,500 cases of secondary anemia seen at the Mayo Clinic from January, 1918, to August, 1919, 146 presented a hemoglobin of 30 per cent or less and approximately forty-one different conditions were responsible for these 146 cases of severe secondary anemia, cancer of the stomach and uterine fibromyomata being the chief causative agents.

2. In the complete series of 146 cases a red blood count below 1,000,000 was observed in only one patient; the lowest hemoglobin was 10 per cent and the highest color index was 1.0.

3. The blood picture in the patients with cancer of the stomach was always that of a secondary anemia and in none did it simulate the blood picture of pernicious anemia.

4. The presence of a severe secondary anemia should always make one suspicious of a possible malignancy, however, and a normal blood picture should not prejudice against the possibility of a malignancy being present.

5. Cervical polypi may be the cause of a severe secondary anemia and demand surgical interven-

tion, not only for this reason but also because of the possibility of their undergoing malignant degeneration.

6. In all cases of anemia of obscure causation hemorrhoids should be considered as a possible source, but such a diagnosis should be arrived at only after a careful exclusion of other possible causes.

7. Duodenal ulcer is an uncommon cause of severe secondary anemia, occurring in only one-half of one per cent of a series of almost 1,000 cases operated on at the Mayo Clinic.

8. A severe anemia is an extremely rare finding as a result of simple entameba hystolytica infection in the absence of ulceration.

9. With regard to sepsis as a possible cause of anemia, the presence of even marked dental sepsis or of very septic tonsils in a patient with a severe anemia should not prejudice against the possibility of other perhaps much more important factors, the discovery of which is of extreme importance in the ultimate checking or curing of the anemia.

10. Although nephritis is a fairly common cause of anemia, when the latter is severe, however, other factors are probably also playing a part in most cases.

11. The rôle played by lues in the causation of the very marked secondary anemias, for example, with hemoglobin below 30 per cent, is a very minor and infrequent one.

12. Anemia due to nutritional disturbance is fairly common, especially in infants and children. However, other possible causes should be considered and ruled out, especially in the severe anemias, before a diagnosis of "anemia due to nutritional disturbance" is made.

13. Exophthalmic goiter, contrary to the usual belief, is a very uncommon cause of anemia.

14. The injudicious use of radium in the treatment of leukemia may initiate a severe anemia with leukopenia.

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23, 24, 25, 26, 27, 28, 29, 31—Quoted by Naegeli. See 13, above.

30. Quoted by Osler. See 15 above.
32. Quoted by Bates. See 1 above.

DIAGNOSTIC AND THERAPEUTIC ASPECTS OF BILIARY DRAINAGE*

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A discussion of the value of Lyon's duodenal drainage for diagnosis and therapeusis in diseases of the gallbladder may be brief or long, depending on a discussion of facts or hypothesis. Theoretically, Lyon's method is attractive in that it supplies a much needed aid to the clinician to substantiate a suspected cholecystic disease and obviates the necessity of operation in mild cases of cholecystitis in which the symptoms are distressing, but hardly justify operation. Actually, the diagnostic and therapeutic aid is not so attractive. No doubt all are familiar with the claims set forth in the voluminous, well-written articles which were accepted until careful honest investigation compelled us to reach a different conclusion.

In order to obtain the sequence of colors of bile, light, dark, and light, representing bile from the duct, gallbladder, and liver, the Lyon technic presupposes truth of the suggestion of Meltzer. Crohn says that Meltzer did not claim, but only suggested, that magnesium sulphate might bring into action the law of contrary innervation and cause relaxation of the sphincter of Oddi and contraction of the wall of the gallbladder. Today, proof is not at hand to show that this actually takes place. We could not demonstrate it at operation; of course, general anesthesia may have interfered with a reflex arc; and it cannot be demonstrated in the experimental surgical laboratories. In actual practice, the play of colors is most confusing because the fractional specimens appear irregularly and intermittently instead of in sequence.

The five reasons why Lyon assumed that the dark bile is gallbladder bile are most simply contradicted by a consideration of the bile obtained from the gallbladder at operation. Its physical, cytologic, and bacteriologic properties differ widely from the dark bile obtained by the tube. Bassler does not agree with Lyon in his reasoning with regard to the origin of the dark bile. Dunn and Connell demonstrated the play of colors in a patient deprived of gallbladder and ducts and claim that dark bile simply represents concentration of magnesium sulphate in the aspirated content. With this my colleagues in the experimental surgical laboratories do not agree. Their work on this subject will be ready for publication soon; it suffices now to say that the dark bile is not an exact representation of gallbladder bile.

The fundamental hypothesis set forth by adherents to the technic that cholecystitis is the result of an ascending infection of the bile ducts from a duodenitis caused by ingested bacteria, does not agree with the most popular idea of the origin of cholecystitis. Cholecystitis is usually of hematogenous origin. The organisms may be from some frank or occult focus and have an elective localization, as proved by Rosenow, in 79 per cent of his experiments, or they may come from an infection of the intestinal tract and set up a primary hepatitis, usually by way of the portal vein or occasionally the hepatic artery. The latter origin is proved by Graham and Peterman, who showed a definite lymphatic communication between the gallbladder and the liver. Their results explain the frequency of simultaneous appendicitis and cholecystitis, for the bacteria of an infected appendix contaminate the portal circulation, causing hepatatis, and cholecystitis develops by way of lymphatic vessels communicating between the gallbladder and liver. Their work is proved experimentally. From operative material, MacCarty emphasizes that cholecystitis does not exist without an associated hepatitis. All of this substantiates the conclusions that cholecystitis is a disease of hematogenous origin and of the wall of the gallbladder. The statement that in cholecystitis the bile is sterile, except in acute cases or in acute exacerbations of a chronic condition, has recently been corroborated by Drennan, of the Mayo Foundation, who found that the bile of only 19 per cent of the gallbladders removed because of cholecystitis contained organisms and, further, *Bacillus coli*, probably a secondary invader, predominated. It is possible to demonstrate further that cholecystitis is a disease of the wall of the gallbladder by demonstrating the organisms in microscopic section or in culture of emulsions of the wall of the gallbladder in cases in which the bile is sterile. Animal inoculation with these organisms causes cholecystitis. In cholecystitis, then, we are dealing with a disease of the gallbladder wall, hematogenous in origin. Fractioned specimens of bile can hardly indicate the condition of the gallbladder wall, particularly since the origin of these specimens is not at all certain and since

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the bile removed directly from gallbladders obtained at operation fails to give definite diagnostic data.

Examination with Lyon's technic of a few patients leads to false positive conclusions, and examination of a large number of patients to confusion. In proved pathologic conditions, the physical, cytologic, and bacteriologic properties are very bizarre; conclusions cannot be drawn because of the lack of uniformity in the findings, yet if one case only were considered, findings could be interpreted to suit that case. The present value of the Lyon duodenal drainage is its stimulating influence to further study of hepatic and pancreatic function.

If the Lyon procedure is not an aid to diagnosis, what can be expected of it therapeutically? The gallbladder is not drained by this procedure and, besides, the disease is not in the bile, but in the wall of the gallbladder. The injection of vaccines prepared from cultures of the turbid bile is certainly erroneously applied therapeusis and only further abuses the already much abused vaccine therapy. The psychic effect of the Lyon procedure on a neurasthenic patient is often most striking, as is any procedure that gains confidence. Because one of the end-results of a cholecystectomy is a compensatory dilatation of the ducts in which the sphincter of Oddi takes part, so that after cholecystectomy a continuous flow of bile takes the place of the preoperative intermittent flow, nothing can be gained by aspiration of the duodenum after stimulation by magnesium sulphate in those cases in which after cholecystectomy there seems to be a residuation of the original infection causing recurrence of the preoperative symptoms or new symptoms.

To effect a cure of cholecystitis, it seems best to perform cholecystectomy, to remove the primary focus, whether appendix, tonsils, or teeth, and to build up the patient's resistance to the residual hepatitis, choledochitis, and pancreatitis. Removal of the gallbladder, with or without stones, frees the patient from the greatest cause of immediate symptoms. The removal of the primary infection aids in a general way and inhibits the continuance of hepatitis or choledochitis. Cholecystitis may be temporized with by most any procedure, as may appendicitis; but the cure lies in cholecystectomy as the cure of appendicitis lies in appendectomy, because in these conditions the inflammatory processes are in the walls of the organs.

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EDITORIAL

Minnesota State Medical Meeting

The annual meeting of our Association should be and is, as a rule, the largest medical meeting in the state each year. The meeting at the University in Minneapolis this fall promises to be the largest in the history of the Association and every effort is being made by the local committee of the Hennepin County Medical Society to provide for the entertainment of the visiting members.

It was decided at an early date by the program committee to limit the speakers almost entirely to the Association membership. No reason was seen why we should depart from the time-honored custom which has considered the state meeting to be for and by the constituent members.

The choice of the University campus for the various meetings is particularly happy. We are assured of auditoriums with sufficiently large seating capacities and proper acoustics. The best of addresses loses its value if the listener is uncomfortable and cannot hear what is said.

An interesting feature arranged by the committee in charge of the *x*-ray exhibit will be the opportunity offered to members to submit interesting films or those of uncertain diagnosis for exhibition. The committee will take occasion to obtain interpretations from visiting specialists for the benefit of physicians submitting films.

In order to admit the large number of papers submitted to the medical section, the speakers will be limited to the reading of ten minute abstracts. The abstracts at each morning or afternoon session will be read in succession and the discussion will follow. The complete papers will be published during the year in Minnesota Medicine.

The National Dairy Show meets the same week in Minneapolis and the members are urged to make up their minds to attend our annual meeting at an early date and to make hotel reservations at once. There is no objection to members taking in the Dairy Show in connection with the medical show. The important point is, will you be there?

A Step Forward

Below, appears a resolution relating to expert testimony passed at a joint meeting of the Hennepin County Medical Society and the Hennepin County Bar Association, which was held at the West Hotel, Minneapolis, May 6, 1922. It is to be sincerely hoped that other medical societies and bar associations will follow the laudable example set by these societies.

There can be no doubt but that the majesty of the law and the integrity of two learned professions will become unquestionable in medico-legal matters if the procedure outlined in the resolution referred to can be universally followed.

The customary relationship of the physician as a paid employee of the litigant must be abolished. Unfortunately, there are practitioners in both professions who will prefer to see this relationship continue, a relationship which runs counter to the best traditions of both professions, but which is at least one cause of unnecessarily prolonged litigation and only adds another to the many causes of the miscarriage of justice.

Any means which will remedy these evils should be welcomed by the professions most concerned and by the laity as well. The next step forward should be the enactment of laws to enforce a system such as is outlined in the resolution and the earnest thought and effort of both professions must be devoted toward bringing this about.

RESOLUTION

Joint Committee of Lawyers and Physicians:

1. WHEREAS, there is evidence of a growing dissatis-

faction with the present method of adducing expert medical opinion offered in the trial of civil and criminal actions, and

2. WHEREAS, such dissatisfaction is due very largely to the heavy burden upon litigants for expert advice; the prolonging of trial work; and the uncertainty of outcome and difficulty of settlement due to the irreconcilable conflict in the testimony on the opposing sides of the case, and

3. WHEREAS, this situation has developed to such an extent that comment by the trial courts and also the courts of last resort, and by others having knowledge of the facts, is taking on a character tending to cast reflection upon the skill and integrity of the members of the medical profession and legal profession, and

4. WHEREAS, with a view of correcting this situation in so far as may be practicable, a joint committee of the physicians and the lawyers has been making a study of this subject for the purpose of working out and proposing some concrete plan or method to be used in connection with trial court work as a means to remove as far as possible this dissatisfaction,

5. NOW THEREFORE BE IT RESOLVED by the members of the Hennepin County Bar Association, and by the members of the Hennepin County Medical Society in joint meeting assembled on May 6, 1922, that all physicians competent to qualify as expert witnesses upon the various subjects of controversy in litigation, shall be named annually by the Hennepin County Medical Society, from which number any trial judge, or any one or more of the litigants in any suit, may select a commission of three or more physicians to conduct a joint examination for the purpose of furnishing expert testimony relating thereto,

6. PROVIDED, HOWEVER, that any selection and appointment of any such commission by the court shall be made only upon stipulation of the litigants, and in any case where the litigants cannot agree upon the three names, each side may select one physician with provision that the two physicians so selected may select a third.

7. BE IT FURTHER RESOLVED, that the compensation for any services rendered in making any such examination, or giving expert testimony concerning same, shall be based upon a schedule to be designated by resolutions of the Medical Society and in no case shall the physicians who make such examinations, or give any such testimony, be permitted to know from what source their compensation is derived, such compensation to be payable through the Clerk of the District Court, or if that is not practicable, then through some trustee.

8. BE IT FURTHER RESOLVED, that it is the intention by this procedure to abolish the established relation of paid employee between any litigant and the physician or physicians giving such testimony in order to secure as far as possible impartial and unprejudiced testimony.

9. BE IT FURTHER RESOLVED, that any physician giving testimony in any case under this arrangement shall be subject to cross-examination under the usual rules by any one or more of the litigants in the case.

The following circular was sent with an explanatory note to each member of the society by the president to be filled in and returned for use in making up a list to be recommended to the courts:

HENNEPIN COUNTY MEDICAL SOCIETY EXPERT CERTIFICATE AND DECLARATION

The present method of obtaining expert medical opinion is unsatisfactory. I therefore believe that the plan as outlined in the resolutions passed at the joint meeting of the Hennepin County Bar and Hennepin County Medical Societies, May 6, 1922, should be followed until some law is enacted that will make it possible for all expert medical opinion to be given by a neutral commission.

I will be willing, under the resolutions adopted by the two societies, to act as a member of a neutral commission on expert testimony in the trial of civil and criminal actions.

Of the divisions of practice hereinafter specified, I am qualified to act as an expert in the ones checked:

1—General Medicine	9—Skin and Venereal
2—General Surgery	10—Genito-Urinary
3—Orthopedics	11—Obstetrics
4—*X*-ray and Radium	12—Gynecology
5—Eye and Ear	13—Anatomy
6—Nose and Throat	14—Physiology
7—Nervous and Mental	15—Pathology
8—Pediatrics	16—Bacteriology

17—Chemistry

I hereby promise to carefully examine and scientifically investigate any case for which I am selected to testify as one of a commission of experts; to give expert opinion only in such branches as I have named, after consultation with other members of the commission; and to give an impartial report or opinion, if cross-examined, according to the best of my scientific knowledge and belief.

(Signed) JOHN DOE.

Following is the resolution relating to fees for expert testimony, adopted by the Executive Committee of the Hennepin County Society:

FEES FOR EXPERT TESTIMONY BY COMMISSION

Be it resolved by the Executive Committee of the Hennepin County Medical Society that the fees for expert testimony by Commission, as per resolutions passed by the Joint Meeting of the Hennepin County Bar Association and the Hennepin County Medical Society, May 6, 1922, be at the rate of $50.00 for each one-half day, or fraction thereof, consumed per member, as the minimum fee, and the maximum fee to be determined by the responsibility and importance of the case.

—P. W. W.

Northwest Veterans' Neuropsychiatric Hospital

The location of the proposed hospital for veterans suffering from nervous and mental disorders in

District 10 has now been determined. After investigating the merits of various sites offered in the District, comprising the States of Minnesota, North Dakota, South Dakota and Montana, officials of the U. S. Veterans' Bureau, Washington, finally selected St. Cloud. Obviously, there are some points in favor of choosing the larger cities for such a hospital. On the other hand, the smaller city, conveniently accessible to the larger centers, offers advantages not otherwise attainable. Physicians know well that proximity to large centers entails added difficulties in regulating environmental features for the mentally and nervously maimed.

By far the largest proportion of the world war veteran population for District 10 lives in the eastern section and practically forces the selection of such a hospital site in this area. The enterprising St. Cloud community may be depended upon to do its utmost in creating and maintaining always a healthy environment which one naturally hopes for the mentally disabled.

In this connection we might recall how, after the close of the war, the cry against federal waste favored the consideration of employing existing government buildings to care for the disabled veterans. The inadequacies for the ever-increasing numbers suffering from neuropsychiatric disorders became however soon apparent to experts in Washington. Congress finally realized the exigencies and appropriated funds to construct thoroughly modern hospitals. We may rest assured that the institution at St. Cloud will be a model of its kind in structure and equipment; and, more than that, it is the Veterans' Bureau policy to conduct these along the most approved methods possible. Doctors are being trained by providing them special courses of training in the specialty. For instance, at St. Elizabeth's Hospital, Washington, under Doctor Wm. A. White, six months intensive courses are being conducted.

The ever rightly persistent public demand that the war maimed be provided with the best possible care for their recovery or alleviation should insure high standards for the future at St. Cloud. May we not also count on possible new influences upon the profession and the people of our state? The establishment of a psychopathic hospital at the University ought to be broadly regarded as looming quite imperatively in medical horizons of Minnesota in order that the functions of special treatment, teaching and research in neuropsychiatry may be given more adequate facilities. J. C. M.

Hay Fever Desensitization

The hay fever season is on at full blast and now is the time to list cases for pre-seasonal pollen inoculation next year. The average individual waits until trouble comes before seeking relief and perhaps in general such an attitude is a good thing. However, pollen inoculations should be given before the season arrives for the reason that it requires several weeks to produce any effect and the resistance produced is only temporary.

The whole subject of so-called "rose cold" and "hay fever" (both of which terms are gross misnomers) has been greatly clarified by the skin sensitization tests. The physician is now justified in giving preseasonal inoculations of the spring type with timothy and the fall type with ragweed without going to the expense of stocking up with many pollens for carrying out the skin tests. The spring type of trouble is caused in the great majority of cases by the grasses—timothy, June grass and red top. Treatment with timothy will protect against all three. The fall type cases are sensitive to a variety of pollens—ragweed, sunflower, golden glow, golden rod, aster and daisy. Of these the ragweed only has a wind-borne pollen. The ragweed is, therefore, the important plant of the group and its pollen is the only one that need be used.

The various commercial houses are now putting out dilutions in series in such convenient and satisfactory form that the administration is a simple matter. Inoculations should be given preferably at five-day intervals beginning some ten weeks before the symptoms are due and the strength of the dilutions increased so that several inoculations of the one to one hundred strength are given shortly before the season arrives.

Walker reports 40 per cent complete relief in both spring and fall types, and a varying percentage of partial relief, with a very small number in his series receiving no relief.

The desensitization or immunity production, whichever it is, is a temporary affair and pre-seasonal treatment for several years at least is necessary. This fact should be emphasized.

Hay fever sufferers have mucous membranes highly sensitive to many forms of irritation. For this reason it is well to eliminate fresh-water bathing and automobiling. The indoor vase of cut flowers and grasses may well be dispensed with also. Perhaps it would be well to add that nasal irregularity should be very carefully sought for in the hay fever subject.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA STATE MEDICAL MEETING

The annual meeting will take place at the University, Minneapolis, Thursday, Friday, and Saturday, October 12, 13 and 14, 1922. The Council will meet at 10 A. M. October 12, at Millard Hall, and the House of Delegates will meet at 2 P. M., the same date and place. Registration headquarters also will be at Millard Hall.

The scientific meetings will occupy Friday and Saturday, October 13 and 14, the medical and surgical sections meeting separately, the former in the Animal Biology building, the latter in the Anatomy building except for Friday afternoon, when a joint meeting of both sections will assemble in the auditorium of the Chemistry building.

Clinics for visiting doctors will be held all day Thursday at the University Hospital and the various hospitals throughout the city. Dr. A. T. Mann has general supervision of the clinics.

Exhibits will consist of the following:

1. Commercial exhibits in the corridors of Millard Hall and the Institute of Anatomy. Dr. S. R. Maxeiner has charge of these exhibits.

2. Scientific exhibits consisting of *x*-ray demonstrations, pathological material, etc. Physicians throughout the state are urged to send in material for this exhibit and should communicate with Dr. K. Ikeda, Minneapolis General Hospital, chairman of this committee. Where a roentgen opinion is desired, the committee in charge will take particular pains to obtain it from visiting specialists for the benefit of inquiring participants. Each film must be labeled showing name of exhibitor, diagnosis and, where desirable, a brief history. Films should be sent directly to the *x*-ray committee, care of Dr. E. T. Bell, Department of Pathology, University of Minnesota, Minneapolis.

3. Demonstrations by the departments of Pathology, Bacteriology, Pharmacology, Physiology and Experimental Surgery.

Physicians and their ladies are invited to the annual banquet which will be held Friday evening. Some lay speaker of note will address the members following the banquet and further entertainment is to be provided. Dr. G. Elmer Strout is chairman of the banquet committee.

The ladies will be entertained by the Women's Auxiliary of the Hennepin County Medical Society.

Golf tournaments and other forms of entertainment will be provided and it is suggested that all physicians who wish to play golf on Friday, October 12, send their names as soon as possible to Dr. H. N. Newhart, chairman of the entertainment committee, 910 Donaldson Bldg.

The Physicians Exchange of the Twin Cities will furnish well-organized telephone and messenger service and information booths will be established at the principal downtown hotels. Dr. Paul Giessler has charge of this particular activity. Lunches will be served at the Men's Union building on the campus on the convention days.

Important! The National Dairy Show is to meet in Minneapolis, October 7 to 14 inclusive. Visiting physicians should therefore make their hotel reservations as soon as possible either directly or by communicating with Dr. E. L. Gardner, 730 LaSalle Bldg. or Dr. S. G. Reynolds, 816 LaSalle Bldg., Minneapolis.

Following appears a list of local committees:

Committee on Arrangements—Dr. E. L. Gardner, Chairman; Dr. Horace Newhart, Dr. J. C. Litzenberg, Dr. W. R. King, Dr. A. T. Mann, Dr. Nimrod Johnson, Dr. P. W. Giessler, Dr. A. E. Smith, Dr. A. F. Schmitt.

Committee on Exhibits—Dr. S. R. Maxeiner, Chairman; Dr. J. B. Carey, Dr. S. M. White.

Scientific—Dr. E. T. Bell, Dr. J. S. McCartney, Dr. W. A. O'Brien, Dr. C. M. Jackson.

X-Ray—Dr. K. Ikeda, Chairman; Dr. R. W. Morse, Dr. F. H. K. Schaaf, Dr. A. W. Desjardins, Dr. T. R. Martin.

Commercial—Dr. S. R. Maxeiner, Chairman; Dr. F. J. Souba, Dr. H. M. Lee.

Committee on Banquet and Entertainments—Dr. G. E. Strout, Chairman; Dr. O. S. Wyatt, Dr. C. E. Willcutt, Dr. F. J. Souba, Dr. Ivar Sivertsen, Dr. T. H. Sweetser, Dr. L. M. Lajoie, Dr. E. R. Hare, Dr. E. D. Anderson.

Committee on Hotel Accommodations—Dr. G. E. Benson, Dr. G. E. Thomas.

Committee on Publicity—Dr. A. E. Smith, Chairman; Dr. W. A. Jones, Dr. C. B. Drake.

THE AMERICAN ACADEMY OF OPHTHALMOLOGY

The Minnesota Academy of Ophthalmology and Oto-Laryngology will entertain the members of the American Academy of Ophthalmology and Oto-Laryngology at its annual meeting, which this year will be held at the University during the week beginning September 18. This is the first occasion that the Twin Cities have been the meeting place of the national association and every effort is being made to make the meeting a success from both the scientific and social standpoints.

It is expected that there will be an attendance in the neighborhood of 1,000 specialists from all over the United States and Canada. Headquarters will be located at the Radisson and St. Paul Hotels, but all the scientific meetings will take place on the University campus. It is the intention to have one large joint evening meeting, which will be open to the public at one of the theaters in Minneapolis. The mornings and afternoons of Tuesday, Wednesday and Thursday of the week will be devoted to scientific meetings to be held in the building of the Men's Union on the campus.

The attention of the members of the Minnesota Academy is particularly called to an intensive course of instruction, which will occupy Friday and Saturday. The course will consist of lectures by eminent authorities in their particular subjects, such lectures to occupy from thirty minutes to an hour. These lectures will continue throughout both days. It will be absolutely necessary for those interested to communicate with Dr. John Morse, secretary, 503 Don-

aldson Building, Minneapolis, in regard to any requirement in the course.

The social side of the program has not been neglected and Wednesday afternoon and evening will be devoted particularly to recreation in the form of automobile rides, golf, steamboat rides over Lake Minnetonka, ending up with a dinner and dinner dance at Radisson Inn, Christmas Lake. For Friday evening a smoker in St. Paul is planned.

A very excellent commercial exhibit will occupy the main floor of the Men's Union building on the University campus during the entire period of the meeting. Representative exhibits will be displayed by leading instrument makers and dealers from all parts of the country.

Arrangements are being perfected whereby Professor Robert Barany, formerly of Vienna and now of the Univesity of Upsala, Sweden, will be the guest of honor at this meeting of the American Academy of Ophthalmology and Oto-Laryngology. He comes especially to read a paper presenting his new method of radical operation for chronic ear suppuration. During the two weeks immediately following the session of the Academy, Dr. Barany will conduct under the auspices of the Minnesota Academy of Opthalmology and Oto-Laryngology a special post-graduate course in Otology.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Southern Minnesota Medical Association will convene at Mankato December 4 and 5, 1922. There will be an afternoon program Monday, December 4, a Physicians' and Surgeons' Banquet and Smoke Monday evening, December 4, and a day session Tuesday, December 5.

The papers will be limited to ten minutes—no discussions, to allow for more papers. Papers will be presented by physicians and surgeons practicing in Minnesota, with one or two exceptions.

The report of the midsummer meeting of the Southern Minnesota Medical Association at Rochester, June 19 and 20, which appeared in the July number of MINNESOTA MEDICINE, stated that the attendance was under 300, thus giving an incorrect idea of the exact size of the meeting. It is with the desire to correct this impression that attention is called to the fact that there were 387 registrations at this meeting and that the checking of all those present who did not register brought the total number of visitors well over the 600 mark.

STEARNS-BENTON COUNTY MEDICAL SOCIETY

The Stearns-Benton Medical Society held their annual picnic at Pelican Lake, July 18. A fish fry was the main feature of the picnic.

Officers for the coming year of the Stearns-Benton Medical Society, who were elected at the last meeting, are: Dr. T. Watson, Albany, president; Dr. J. P. McDowell, St. Cloud, vice president; Dr. J. N. Libert, St. Cloud, secretary-treasurer; Dr. W. L. Beebe, St. Cloud, delegate to state convention; Dr. H. B. Clark, St. Cloud, alternate.

COMMUNICATIONS

A LETTER FROM VIENNA

The present situation in Vienna is somewhat turbulent. One man's guess is as good as another's, but it is only a question of time until some outside influence must come in to allow the ordinary economic channels to be restored and the people to live naturally. The financial plan of endless printing of worthless money goes on apace. It was freely stated that this would stop as soon as the cost of paper and printing became greater than the face value of the notes. Thus, like many other economic reflections, the results of the war have proven erroneous; the money presses will run as long as they are fed and manned, and Austria is still some distance behind Russia in money production. Street car rides that cost forty kronen in March, 1922, now cost three hundred and fifty. Bread costs have gone up proportionately; and bread continues to be the standard nourishment of the masses—few buy fats or much meat.

Strikes are present and others imminent; it is not so much a question of higher wages, but lower food costs.

In this situation foreign visitors are numerous and carry various financial media that are very acceptable to the natives. But with what result? The well-stocked stores and restaurants are for them; they virtually bid for the materials and prices are gradually and inevitably raised for the local people. As the situation has become more and more unstable, the kronen has depreciated, so that it is now worth only about twenty thousand to the dollar. While the visitors are a godsend to the banks and to the merchants, they are one of the factors which make the common lot very unhappy.

Yet, Vienna is outwardly very natural and, as usual, "happy." The many old medical friends of Vienna would find, at least at this fruitful period of the year, very little to suggest the "Inferno" which has been experienced. They were never a boastful people, and in the hour of adversity they are not complaining. To direct questions they answer directly: Wilson's "principles" raked them of both territory and honor; France's fear of German strength forbids any political or economic union with Germany; they didn't want war and were forced into it by Russia; Germany is credited with having *prolonged* the hideous war.

There have been a few recent severe critics of medical instruction and opportunities in Vienna. I do not wish to make the mistake of equally rash judgment, and hesitate to send any information based upon as short a visit as I am making here. However, I must state that there are at least 125 medical men here at present and they are an almost exact replica of the group I saw here and worked with ten years ago. Considerably over one-half are studying eye, ear, nose and throat; the other specialties and general medicine are fairly liberally represented. Canada, South Africa, the British Isles send a moderate number; all are rallied in a fine cameraderie, the result of their common purposes and desires.

The old Vienna A. M. A. went to pieces some time ago with a grand turmoil quite like that experienced by us in 1912, and spoken of by the older men as a not uncommon experience. A new set of officers has been elected with a Minnesota man, John Gelz of Richmond, as president. As usual, there is a much larger quota of Minnesota men here

than from any other single state. This is curious and reflects either the greater tendency on the part of Minnesota doctors to take graduate work, or a greater love and belief in the clinical opportunities of Vienna.

Dr. O. W. Scholpp of Hutchinson has been here for some months and he and a group aggressive like him have been getting splendid work, in the same characteristic dynamic manner as has always characterized the varying percentage of Americans abroad who were really out for work. These men have been putting in long days with courses up to nine and ten o'clock at night. Much freer use is being made of some of the outlying hospitals than formerly. Stoerck, in addition to his position in the Allgemeine, is pathologist to the "Trieste" hospital. He has a large group doing pathology with him three times a week. Several men, including Dr. Jones of Minneapolis, told me the gynecological opportunities were unlimited. I went by invitation to one of Prof. Fraenkel's lectures and he was just as fascinating as usual. Tandler, despite his official connection with the local parliament as presiding officer, is inspiring, as before, men earnest in preparation for surgery. I noticed these men buying very freely of the recent remarkably illustrated anatomical works. This is a great opportunity to build up a fine library for those equal to a tussle with the German language. It is to be hoped that the study of German will return in our schools, because it has a very rich medical literature, as every one knows. Von Eiselsberg has been operating daily. Whatever else may be said about some of the features of their technique and their nursing training, some of our operating room nurses should watch the nurse who hands him his ligatures and instruments. She is almost uncanny in her promptness.

Is Vienna the medical center that it was before the war? Is it a good place for Americans to go now? The old morgue room in the Krankenhaus is cleaner and sprightlier than it has ever been before, thanks partially to the Rockefeller Foundation. Erdheim is sectioning and demonstrating on the same old stone table used by Rokitansky. They have 65 to 70 per cent of the material they had formerly, and have the same amazing variety. He is capable of giving better courses even than he gave before. Old Theodore is dead but the autopsy material is worked up so that it is absolutely like everything else in Vienna—artistic; it is like rare hand-made lace. Nothing is torn and disturbed. The gross pathology opens up like the pages of a beautifully bound book. The men are not all taking advantage of this classical and unique Vienna opportunity, but this is a neglect due to the fact that the men have been diverted to taking more practical courses. In due time the Corrected Blue Book will be published; the strikes and uncertainties will become history; an outside protectorate will develop and men and their families may come here freely. I may say that I have conversed with many men, both recent recruits and "old timers" here in E. E. N. & T., and all are abundantly satisfied. Dr. W. L. Colby of St. Paul reported to me, as did Dr. Wm. Hinz of New York, very favorably on the work available in pediatrics. While many courses are offered in English and some have been given long enough to attain great smoothness, it is far better to blunder badly into the German language. It is a virile speech and has already withstood most heroic punishment at the hands of some of us interested not in what the language is, but what it gets us. As always, the whole spirit of the Viennese is friendly; for many generations they have featured the complementing arts—music and medicine.

Desiring a memorial on the occasion of the fiftieth anniversary of Franz Joseph's reign, they erected the beautiful Jubilaeum's Hospital in 1912. It is a magnificent combination of architectural beauty and scientific modern equipment. It is as typical of the medical interest of the people as are their numerous theatres and concert halls expressive of their music.

Anarchy may come in our own country; it is freely talked of in Italy, and is a decided possibility here. Watch the coming winter and keep in touch with the Vienna A. M. A. Study Bertha Lewis' books (she now has several in varying specialties—the outgrowth of her appreciated "Vade Mecum"). If all goes well by next March, take my word for it: do not hesitate to come to Vienna for medical study.

—E. L. Tuohy.

Munich.

Dear Dr. ———:

The postal authorities have come to the conclusion that there must be some one by the name of Williams in this part of Europe. We have been receiving mail with practically every delivery so we know that we are not forgotten by the folks we have left behind. It takes on an average about two weeks for mail to reach us from the Twin Cities, which is not bad considering the amount of handling it requires and also certain obstacles which are evidently common to both continents such as "strikes." We see an American paper occasionally which gives us some of the details in regard to the miners' and railroad strike. Over here, we have the dock workers on a strike, so that interferes to a certain extent with the mail. The barbers' union held a meeting last night, but up to the time of writing have not heard as to the effect upon the public. From the appearance of two different "sects" over here, the barbers do not have much to do. One sect appears to receive "home treatment" such as I used to get every summer. Their hair is clipped tight, not even around a bowl. The other sect must have made some sort of wager on the outcome of the war, for it is clearly evident that their hair has not been cut since the armistice. This type also must have a boycott against the tailors' and shoemakers' unions. They wear knee pants—no stockings—sandals on their feet and some wear a shirt without a coat and others vice versa.

I have been rather fortunate during the past week or so in getting in touch with some real good physiological chemistry. Dr. Boehm, one of Muller's assistants, is working on the blood with the view of obtaining some means of an early diagnosis in cancer, also as a check on the roentgen therapy. He has obtained some very satisfactory results during his year of research, but is not ready to publish them. He wants to work up his series a little more thoroughly.

The German medical profession seem to be working on three or four main ideas. I make this statement from my own personal observation and a review of their literature. Cancer at present is being thoroughly investigated. The German is trying his best to attach a bacterial etiology

to it. Early diagnosis and roentgen therapy seem to be the main features. Tuberculosis comes in for its share. There are several groups of investigators who are combating among themselves on the question of immunology in tuberculosis. Koch's followers at present are somewhat in disgrace because of a new test based on the "Allergy theory"—that is, using a vaccine containing the so-called "Tuberculin albumen." To me, from the review of some 50 cases here in the hospital, this gives much more satisfactory results.

Syphilis is the one subject that is always a topic of discussion. The number of tabetics one sees here on the street is appalling. The various types of treatment are about as numerous as there are investigators. The Wassermann test is being modified in numerous ways.

Endocrinology has secured quite a hold here both in Germany and in Austria. Professor Biedl of Prague, who spoke here a short while ago, is the main promoter and he has some very good proofs of his theory. As to the "monkey glands," there is more in the newspapers. An interesting factor that I had brought to mind was in the extirpation of the thyroid. The surgeon always examines the specimen to determine whether or not the parathyroids have been removed. If they have, he immediately transplants them into the tissue of the neck. As to their potency thereafter, there is some doubt in my mind because there is always the possibility of some aberrant glands. But, however, he laid considerable importance on this procedure, as in over 1,000 cases they had only 5 cases of tetany.

Adrenalin seems to be a cure-all for everything. It is given in bronchial asthma, in diabetes mellitus and insipidus, also in tetany and even in hermaphrodites. The therapy used here is very similar to that in the states except that there is a much larger number of patent medicines used.

Our stay in Munich is just about half over and after the first two weeks has been very pleasant and practical. We have made arrangements for rooms in Zurich. * * * The original plan was to spend most of our time here in Munich with the cheaper living conditions, but that has been denied us, so the only thing we can do is to leave for the United States. We plan to remain in Zurich until the middle of November and arrive in the Twin Cities around Christmas.

We are enjoying the best of health and the weather is delightfully cool. An overcoat is not out of place anywhere after 6 o'clock in the evening. I wish we could exchange with you for some of your good old Minnesota summer.

Best regards to all. * * *

As ever,

C. K. Williams, M.D.
(St. Paul)

Munich, July 26,1922.

Dear Dr.————:

We are still in the land of "Beer and Pretzels," and it is well named, for it is an everyday sight to see members of all walks of life eating them. They buy them the same as the Americans buy chocolate and we have adopted that custom, too.

Last Saturday we took in the "Gewerbeschau," which is very similar to our State Fair, but much more beautiful. There are on exhibition everything from a railway train to artificial limbs, fine pieces of hand-made lace to life-size model houses, This exhibition lasts from May until October. As I started to say, we "did" this in regular German style, that is, taking our lunch in a paper bag and going to the beer hall and ordering a stein of beer. They, the restaurant people, are certainly imposed upon. You can occupy a table all afternoon on the strength of one order of a single cup of coffee or a stein of beer. Another interesting feature is that they never render a bill. You have to call and insist upon paying it. Furthermore they allow you to figure it out, that is, state what you have had. It seems to me that they rely too much on one's honesty. I don't imagine our friend . . . . would adopt their system and make money very long.

Last week we visited one of their famous museums, the Deutsches Museum, and that certainly is a novel institution. They have rooms upon rooms full of all types of inventions from a microscope to a printing press, showing all the steps in the development of each article. The most wonderful of all is the salt mine in the basement. They have halls and galleries with all the implements, including compressed air drills, electric cars, stables for horses and first aid stations. They have a room devoted to optics, one to acoustics. Here, one could almost take a course in eye and ear. We spent two hours there one afternoon and three the next and then we did not see it all. All this comes for the price of 5 marks (4.5 marks to the cent).

We see by the papers that the United States is having its labor troubles as well as Germany. There are numerous rumors of a general strike here, but so far everything is peaceful. The railroads, telephone, telegraph and post-office are all under the government, so that helps a little. Another thing favorable to us is that Bavaria is not in sympathy with the unrest in the rest of the Germany Republic. We were informed the other day that our reception was much better than that given to a Prussian, so that has some advantage.

The University is just about to close for the summer, and the senior students are all preparing for their examinations. Also they are all blossoming out in black frock coats with gray striped trousers, which is the garb of the graduating class.

Lately I have been thrown in contact with several of the internes and have seen "behind the scenes," so to speak. They have the fundamentals well drilled into them, in fact, probably too much, as they have little confidence in their own ability. No one over here thinks of writing a prescription. All their therapy is taken from a "Rezepttashenbuch," which has hundreds of prescriptions all numbered and they order their medication by number. This is partly due to the high price of drugs and these prescriptions are the cheapest form of medicine. Another feature I noticed was the large number of patent medicines used. Many of these are gradually being introduced into the United States. The large medical houses oftentimes furnish the various clinics

with large quantities of their preparations for the privilege of using the name of the doctors, and in this way these preparations are made known to the internes and students, who, rather than think out a prescription, merely order the original package, etc.

I am enclosing an extract of an article which to me is rather interesting, and which shows more or less the general trend of medical research. One of the professors here is working on the same subject and I expect that his results will more or less verify these. . . .

As ever,

CLAYTON K. WILLIAMS.

EDITOR'S NOTE: The above communications are of particular interest taken in conjunction with each other and as an indication of the attitude of the post-war authorities in Austria and Bavaria towards foreigners. Every effort has been made and is being made to induce foreign medical men to do post-graduate work in Vienna: not so in Germany. Before the war, Munich attracted quite a number of American medical men, internists particularly, Professor Frederick Muller being the chief attraction. Shortly before the war the large number of Russian medical undergraduates attending the clinics in Munich presented a difficult problem to the school authorities. The few Americans were welcomed to the lectures, no charges were made, the usual courtesies between members of the profession were extended and the commercialism which had been developed in Vienna was frowned upon. It should be stated, however, that the organization of the post-graduate work for foreigners in Vienna, for the most part Americans, was formed by Americans for the mutual advantage of local men and visitors. It was generally felt that the fees were quite reasonable. In this connection it is interesting to note in the last announcement of post-graduate courses in Vienna that the enrollment fee for Austrians is 3,000 K, for Hungarians, Poles, Russians, etc., 15,000 K, and for other foreigners, 30,000 K. This discrimination may be irritating to some and yet a registration fee of 90 cents (rate—3 cents for 1,000 K) is not particularly exorbitant.

MEDICAL REGISTRATION IN MINNESOTA

Editor of MINNESOTA MEDICINE:

In your August issue, under items "Of General Interest," you quote statements purporting to be made by the two Medical Regents of the University regarding the registration of students in the Medical School. I do not know about the authenticity of the statements quoted, but the facts and figures stated are so broadly in error that they should stand corrected before your readers.

Dean Lyon's recent address before the Hennepin County Medical Society, entitled "The Medical School, the Medical Profession and the Public Welfare," printed in the Journal-Lancet of August first, refers to some of the questions at issue; but it may be assisted by a definite recital of the statistics of registration for the coming Fall quarter.

It is stated in your columns that there are 250 "premedics" seeking admission to the Medical School. Actually, 197 applications, including students of the University the State, and some few from colleges outside the State, pre-medical course, students of other academic colleges in have been received.

It is stated in your item that only eight of the 250 alleged applicants have been admitted. This is manifestly a typographic error, but none the less misleading to the uninformed. Doubtless it was meant to read "eighty," which is the registration limit set, for some years past, by the Board of Regents. As a matter of fact, however, the Administrative Board of the Medical School, anxious to strain the school's possible capacity to the utmost, has recommended the registration of 100 new students and, to meet the possible occurrence of vacancies in the list, has provisionally accepted seven others. All the students of this group have satisfactorily completed the entrance requirements of the School.

Of the remaining 90 students, who failed of acceptance under this enlarged limit of registration, 22 were residents of other states; to whom, even though some of them have made good preparation, the University does not have the same obligation that it bears to its home students.

Of the remaining 68 Minnesota applicants, all were deficient in entrance requirements in one way or another. It may rest unchallenged that even the need of more doctors, and the need is purely hypothetical in this State, should not dictate a diminution of the standards of fitness. Those standards are the product of a generation of experience in medical education.

It is unquestionably true that the State is obligated to educate in medicine Minnesota students whose preparation argues them initially fit and whose earnestness of purpose suggests a well-developed desire for education. The University assumed that obligation when it agreed to the unification of medical teaching under the control of the State in the year 1908. It has fulfilled the obligation only in part. It is possible of fulfillment as a whole.

It is safe to say that it cannot be done by the expedient of a double shift of students. This would be a costly device and would only make bad matters worse. It would necessitate more full-time teachers and they are not easy to get. It would demand a larger contribution of hours from part-time teachers, most of whom would be unwilling to give it. It would necessitate more equipment and added laboratory space, both of which are badly enough needed now. It would mean more hospital beds, for which the school has been crying these many years. Aside from building costs, it would call for an increase of budget, probably equivalent to the interest on the building costs.

And the solution of the whole problem is so simple a one anyhow. The building costs must be incurred sooner or later. Incur them now. The Medical School, the Medical Profession and the Public, the three parties in interest, to whom the Dean's address refers, would stand back of the permanent investment, when they would not approve any more temporary expedients.

With the wings of Millard Hall and the Institute of Anatomy completed, with the University Hospitals' capacity increased to 550 beds, the Medical School can fully perform its function in the education of an adequate number of physicians; it can maintain the quality of that education for which its faculty has always stood; and it can keep its place in the front line of the teaching institutions of medicine in the country. It is probable that the Board of Regents has no obligation greater than this.

RICHARD OLDING BEARD.

OF GENERAL INTEREST

Dr. J. M. Fisher, formerly of Virginia, has located at St. Peter.

Dr. E. A. Olson, formerly of Cook County Hospital, has located in Duluth.

Dr. Arne Oftedal of the Fargo Clinic is spending his vacation in the Twin Cities.

Dr. and Mrs. E. L. Tuohy of Duluth have returned from an extensive trip to Europe.

Dr. G. H. Walker of Fairfax has sold his practice, which he will relinquish October 1.

Dr. G. I. Badeaux of Brainerd recently returned from a short trip to Portland, Oregon.

The Northwestern Pediatric Society held a meeting in Rochester Saturday evening, July 22.

Dr. and Mrs. E. H. McIntyre of Virginia have returned from a motor trip to the Twin Cities.

The Board of Regents of the University of Minnesota held a meeting in Rochester, July 10.

Dr. A. A. Deslauriers of Duluth has moved to Florida, where he will operate his fruit ranch.

Dr. George C. Doyle is now associated with Dr. C. L. Haney and Dr. O. E. Heimark at Duluth.

Dr. A. E. Williams has given up his practice at Backus and has located at Fall Creek, Wisconsin.

Dr. and Mrs. J. S. Shrader of Springfield have returned from a week's tour of northern Minnesota.

Dr. and Mrs. George L. Merkert of Minneapolis have returned from a three weeks' trip on the Great Lakes.

Dr. T. H. Sherman, of Franklin, has just returned from a two weeks' trip through the northern part of the state.

Dr. and Mrs. H. T. McGuigan of Red Wing arrived home the latter part of August from a summer spent in Europe.

Dr. Carl Johnson of Dawson visited friends at Moorhead on his way to Pelican Lake, where he is spending a few weeks.

Dr. and Mrs. John L. Haskins of Morgan are the proud parents of an eleven-pound daughter, who arrived August 8.

Dr. and Mrs. Henry Binger of St. Paul visited with friends in Duluth prior to taking a lake trip to Buffalo in August.

Dr. W. Ray Shannon has announced the removal of his office from the Hamm building, St. Paul, to 550 Lowry building.

Dr. and Mrs. F. H. Dubbe of New Ulm have returned from a ten days' trip to Duluth, Port Arthur and other lake points.

Dr. E. J. Hynes, Tower, has returned from Chicago and has resumed his position as attending physician at the Soudan hospital.

Dr. Earl J. Bratrude, who recently completed his internship at the Minneapolis General Hospital, has located at Sacred Heart.

Dr. and Mrs. E. H. Frost of Willmar have returned from a month's trip to Glacier Park, Spokane, Seattle, and other western points.

Dr. and Mrs. Horace Newhart of Minneapolis have returned from an extended motor trip through the northern part of the state.

Dr. Frederick Eberson, of New York, is temporarily associated with the staff of the Section of Dermatology at the Mayo Clinic.

Dr. Charles E. Caine of Morris has been appointed by Governor J. A. O. Preus as a member of the state board of medical examiners.

Dr. Henry Takacs has left Hitterdal, where he has been practicing for the past four months, and has located at Taylor, North Dakota.

Dr. Hugh Reynolds has taken charge of the Nashwauk hospital during the absence of Dr. M. F. Hayes, who is absent on his vacation.

Dr. and Mrs. John F. Fulton, of St. Paul, have announced the engagement of their daughter, Louise A., to Richard Relf of that city.

Dr. R. C. Hunt, who has been resting and recuperating for some time at the St. Paul sanatorium, has returned to his practice at Fairmont.

Dr. P. A. Schmidt, formerly of Good Thunder, has taken up his practice at Renville, where he will be associated with Dr. E. M. Clay.

Dr. H. G. Lampson of Nopeming with his son and daughter recently took a four days' hiking trip from Buyck to Ely over the Echo River trail.

Dr. and Mrs. O. J. Baldwin of Chisholm have returned from a two weeks' motor trip to Rockford, Illinois, and other points east of Minnesota.

Dr. G. D. Murphy of Keeline, Wyoming, formerly of Murdock, Minnesota, has returned to Murdock for the practice of medicine in that locality.

According to report from physicians in the Red River Valley district, crop conditions there are quite hopeful and the yield will be at least a fair average.

Miss Edith Higley, who has been a fellow in Clinical Bacteriology in the Mayo Foundation since September, 1920, has left for her home in Waukegan, Illinois.

Dr. O. W. Scholpp of Hutchinson has returned from Vienna, Austria, where he has been engaged in medical studies and research work for the past four months.

Dr. J. B. Claire of Winsted has returned from Minneapolis, where he had been taking treatment for his knee, which he injured some time ago while cranking his car.

Dr. and Mrs. A. C. Baker and four children of Fergus Falls are enjoying an automobile trip to Pittsburgh, Washington, D. C., and points in New York and Massachusetts.

Dr. Edward Vernon Martin announces the opening of an office for the practice of surgery at 620-621 Wall Building, Vandeventer Avenue and Olive Street, St. Louis, Missouri.

Dr. James H. Farrage, formerly of Winnebago City, has opened his offices for the practice of medicine in Santa Ana, California, where he will specialize in the diseases of women and children.

Dr. M. J. Fardy, who has completed a three years' fellowship in surgery, in the Mayo Foundation, left August 4

to motor to North Dakota, where he will be associated in practice with Dr. Devine.

Dr. and Mrs. A. L. Baker of Kasson have returned from an automobile trip to Benson and other points in the western part of the state. They were guests of their daughter at Benson for two weeks.

Dr. C. A. A. Joshlyn of Mankato has retired from practice and has moved to Dodge county. Dr. Joshlyn located in Mankato in 1877 and maintained an office at 304 South Front Street for many years.

Dr, J. A. Thabes of Brainerd has been appointed by Governor J. A. O. Preus as a member of the State Board of Health to fill the vacancy caused by the resignation of Dr. Egil Boeckmann a short time ago.

Dr. A. E. Nichols, of St. Paul, has been recently appointed chief deputy city health officer to succeed Dr. J. S. Abbott, who has resigned. Dr. Nichols has been a medical inspector in the bureau for several years.

Dr. I. H. Kiesling, of Nashwauk, was recently elected a member of the Nashwauk-Keewatin school board. Dr. M. F. Hayes, of Nashwauk, and Dr. E. H. Loefborrow, of Keewatin, were re-elected school physicians.

Dr. and Mrs. Thomas R. Watson have returned from a month's stay in Toronto, Canada, where Dr. Watson visited with a sister whom he had not seen in 38 years. The trip to Toronto was made over the Great Lakes.

William Coventry, son of Dr. and Mrs. W. A. Coventry of Duluth, is a member of the crack senior crew of the Duluth Boat Club which recently won every event entered at the National Regatta held in Philadelphia.

Dr. W. A. Allen, of Rochester, was cited in a home newspaper recently as being the oldest practicing physician in the state. Dr. Allen has passed his eighty-eighth year and is still very active in his profession.

Dr. and Mrs. Herman Linde of Cyrus have returned from a honeymoon trip through Yellowstone Park and other points in the west. Mrs. Linde was Miss Inga Hippe of Cyrus before her marriage, which occurred June 27.

Dr. Alberta F. M. Greene has given up her position as staff physician at the Fergus Falls State Hospital and has taken up her duties as assistant superintendent of the New York Reformatory for Women, Bedford Hills, N. Y.

Members of the Nicollet-LeSueur County Medical Society and their families held their annual picnic at Lake Jefferson Thursday, August 3. Boating, fishing, swimming and other outdoor sports formed the day's entertainment.

Dr. E. P. Cathcart has completed a one year's Special Fellowship in Dermatology and Syphilology in the Mayo Foundation and has gone to St. Francis Hospital, Pittsburgh, for one year. He expects to return to the clinic July 1, 1923.

The marriage of Dr. Douglas S. Corpron, son of Dr. William Corpron of Yakima, Washington, who formerly practiced at Slayton, Minn., and Miss Grace Chapman of Redwood Falls, was solemnized at the home of the bride's parents, July 12.

Dr. J. J. Gelz of Richmond, who is spending a year in Europe, has been made president of the American Medical Association in Vienna, Austria, where he is located at present. Dr. Gelz will go to London this coming winter to specialize in eye work.

Dr. D. Parham, who has completed a three years' fellowship in surgery in the Mayo Foundation and received the Degree of Master of Science in Surgery, June 14, 1922, has left the clinic and has gone to the Woman's Hospital, New York City, New York.

Work has begun on a new office building which Dr. C. I. Oliver of Graceville is erecting for himself and Dr. J. M. Arnson of that city. The edifice will contain on the ground floor three office rooms, a reception room, *x*-ray room and developing room, laboratory and record room.

Dr. R. Fitz, who has been Professor of Medicine in the Mayo Foundation and chief of a medical section since August 15, 1920, has left the clinic to become Associate Professor of Medicine at Harvard University and Visiting Physician at Peter Bent Brigham Hospital, Boston.

Dr. D. B. Pritchard, Dr. E. M. McLaughlin, and Dr. L. W. Steiner, all of Winona, have been appointed by Dr. Hans Lichtensteiner, president of the Winona County Medical Society, as representatives of that county on the legislative committee. Dr. Pritchard has been named chairman.

Dr. A. S. Hoiland has returned from New York, where he spent a year in post-graduate work, and has opened offices in the Masonic Temple, Minneapolis, for the practice of medicine, specializing in diseases of the eye, ear, and throat. Dr. Hoiland formerly had his practice at Argyle.

Dr. and Mrs. W. J. Mayo, Mr. and Mrs. J. H. Kahler and daughter, Mary, Mrs. M. H. Mellish, Mr. C. P. Joy and Miss Lilias Joy, of St. Paul, have returned from a three weeks' motor trip to Yellowstone Park. From Yellowstone Park they went to Estes Park, where they visited Dr. and Mrs. Balfour.

Dr. P. W. Wipperman, executive officer of the Asbury Veterans' Bureau hospital of Minneapolis, received notification the latter part of July of his transfer to the Veterans' Bureau hospital at St. Louis, Mo. Dr. Wipperman assumed his duties as medical officer in charge of the St. Louis hospital in August.

Dr. H. M. Knudtson has returned to Pipestone to resume his practice after a several months' absence spent in the University Hospital, Minneapolis, followed by a visit to his former home in Hunter, N. D., for recuperation. Dr. Knudtson has severed connections with the Pipestone clinic and has established offices for private practice.

Dr. Ross Gamble, who for the past year has served as an interne at Walter Reed hospital, Washington, D. C., together with his brother, Dr. William Gamble of the Veterans' Bureau, Minneapolis, spent several days last month at their former home in Rochester. A third brother, Paul Gamble, is now in his junior year of medicine at the state university.

Dr. and Mrs. Donald D. Van Slyke, of New York, visited the Mayo Clinic July 26. Dr. Van Slyke is a member of the Rockefeller Institute and is in charge of the Experimental Laboratory on the chemical side. Dr. and Mrs. Van Slyke are on their way to China, where Dr. Van Slyke will participate in teaching, for six months, at the Medical School at Pekin.

Dr. Robert E. Farr and Dr. Stanley R. Maxeiner have moved into their new offices at 1645 Hennepin Avenue, Minneapolis, and are now practicing under the name of the Surgical Clinic of Minneapolis. The new offices, which comprise the third floor of a large office building, are equipped with every modern convenience for the practice of medicine and surgery.

Dr. John W. Tipple, former executive officer to Dr. H. B. Fralic, medical officer in charge of the Aberdeen hospital for war veterans in St. Paul, left last month for Memphis, Tennessee, where he is to have charge of a new hospital for disabled veterans. Dr. Tipple has been medical officer at the Aberdeen hospital since it was opened in 1921. No announcement of his successor has been made.

The Public Health Building at the Minnesota State Fair.—Unique exhibits and entertainment features are being planned by seventeen public health agencies of the Twin Cities and the Northwest for the purpose of educating visitors to the Minnesota State Fair in matters of health. This is the third year that a special building has been set aside at this fair for public health activities, and the Minnesota State Fair board was the first board of its kind in the United States to create a special department of public health for a state fair. Dates for the Minnesota fair are September 2-9.

Education of both parents and children in child hygiene will be largely emphasized. There will be a $500 children's prize contest for healthful mouths and good teeth, entertainments by a "Toothbrush Man" to impart lessons in oral hygiene, a storekeeper who exercises his discretion in the kinds of foods he will sell to children, an exhibit to illustrate the value of physical inspections of rural school children, a series of child health plays, and a 12-panel exhibit on child feeding and training.

The exhibit of the Minnesota State Board of Health will put into layman's language the facts he should know about preventable diseases, sanitation with reference to milk, water and sewage disposal, venereal diseases, vital statistics, and child hygiene with particular reference to Minnesota's participation in the provisions of the Sheppard-Towner bill. The need of legislation for higher standards of nursing education will be emphasized in the exhibit of the Minnesota State League for Nursing Education.

Organizations participating in the exhibits and entertainment features of the health building are the Northwest Pediatric Society, the American Red Cross, the Minnesota State Board of Health, the Minnesota Public Health Association, the Minnesota State Dental Association, the Minnesota State Sanatorium Advisory Commission, the Minnesota State League of Nursing Education, the Twin City Industrial Nurses, the Minneapolis Health Department, the Hennepin County Public Health Association, the Hennepin County Tuberculosis Association, the Minneapolis Infant Welfare Society, the Minneapolis Visiting Nurse Association, the St. Paul Baby Welfare Society, the Wilder Charity Nurses of St. Paul, the Ramsey County Public Health Association, and the Hennepin County Rural Public Health Nurses.

Communications may be addressed to Mr. Ival McPeak, Director of Health Publicity, Minnesota State Fair,, 89 South Tenth Street, Minneapolis.

NEW AND NON-OFFICIAL REMEDIES

During July the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

THE ABBOTT LABORATORIES:

Neocinchophen-Abbott Tablets, 5 grains.

LOUIS HOOS:

Hoos Albumin Milk.

MALLINCKRODT CHEMICAL WORKS:

Benzyl Benzoate-M. C. W.

Antianthrax Serum-P. D. & Co.—An antianthrax serum (see New and Non-official Remedies, 1922, p. 284) marketed in syringes containing 50 c.c. Parke, Davis & Co., Detroit.

Antimeningococcic Serum-P. D. & Co.—An antimeningococcus serum (see New and Non-official Remedies, 1922, p. 286) marketed in packages of two syringes, each containing 15 c.c.; also in packages of one syringe containing 50 c.c. Parke, Davis & Co., Detroit.

Diphtheria Toxin-Antitoxin Mixture-P. D. & Co.—A diphtheria antitoxin-toxin mixture (see New and Non-official Remedies, 1922, p. 282). Each cubic centimeter represents a single human dose. It is marketed in packages of three bulbs representing one immunizing treatment; also in vials containing 20 c.c. Parke, Davis & Co., Detroit.

Tuberculin B. F. (Bovine)-P. D. & Co.—A preparation of tuberculin Denys (see New and Non-official Remedies, 1922, p. 296). It is made in the same manner as tuberculin Denys (Human), except that the bovine type of tubercle bacillus is used. It is marketed in packages of six 1 c.c. sealed glass tubes. Parke, Davis & Co., Detroit.

Borcherdt's Malt Cod Liver Oil and Phosphorus.—Each 100 c.c. contains phosphorus, 0.009 gm.; cod liver oil, 25 c.c., and malt extract (plain) (see New and Non-official Remedies, 1922, p. 176), 75 c.c. Borcherdt Malt Extract Co., Chicago. (Jour. A. M. A., July 8, 1922, p. 135.)

Yeast Preparations. — The Council on Pharmacy and Chemistry has adopted a general discussion of yeast preparations for inclusion in New and Non-official Remedies. In this article it is stated:

The use of yeast as a bactericide in external infections has been practically abandoned. Yeast and preparations derived therefrom have been widely extolled of late as sources of vitamin B whenever there may be indications for its therapeutic use. However, these indications are so indefinite and the opportunities of obtaining vitamin B through the customary foods are so abundant that the demand for yeast vitamin seems to be limited. The therapeutic aspects of the vitamin problem are still in the experimental stage. Yeast has a laxative action, but the cause of this action is not known. Yeast has been recommended for internal administration because of its supposed beneficial effects upon furuncles, acne, etc. Many clinicians doubt this effect, which may, after all, be expected from any anticonstipation agent. It is not clear to what extent, if at all, live cultures of yeast may be used to change the intestinal flora in cases where such a change is desirable. (Jour. A. M. A., July 8, 1922, p. 135.)

Epinephrine-G. W. C. Co. — A brand of epinephrine-N. N. R. It is marketed in vials containing epinephrine-G. W. C. Co. (base), 1 grain, and in the form of epinephrine chloride solution-G. W. C. Co., which contains epinephrine hydrochloride equivalent to 1 part of epinephrine in 1,000 parts of physiological solution of sodium chloride. G. W. Carnrick Co., New York.

Pituitary Extract-Lederle (Obstetrical).—An extract of the posterior lobe of the pituitary body of cattle, approximately two and one-half times the strength of solution of hypophysis, U. S. P., preserved by the addition of chlorbutanol. For actions and uses, see New and Non-official Remedies, 1922, p. 213, under Pituitary Gland. Pituitary Extract-Lederle (Obstetrical) is marketed in 0.5 c.c. and 1 c.c. ampules. Lederle Antitoxin Laboratories, New York.

Pituitary Extract-Lederle (Surgical).—An extract of the posterior lobe of the pituitary body of cattle, approximately five times the strength of solution of hypophysis, U. S. P., preserved by the addition of chlorbutanol. For actions and uses, see under Pituitary Gland, New and Non-official Remedies, 1922, p. 213. Marketed in 5 c.c. vials. Lederle Antitoxin Laboratories, New York.

Typhoid Vaccine (Prophylactic)-P. D. & Co.—A typhoid vaccine (see New and Non-official Remedies, 1922, p. 310). Marketed in packages of three ampules, containing 500 million, 1,000 million and 1,000 million killed bacteria, respectively; also in packages of three syringes, containing 500 million, 1,000 million and 1,000 million killed bacteria, respectively. Parke, Davis & Co., Detroit.

Gonococcus Vaccine-P. D. & Co.—A gonococcus vaccine (see New and Non-official Remedies, 1922, p. 301). Marketed in packages of four 1 c.c. bulbs, each containing 1,000 million killed bacteria; in packages of four 1 c.c. syringes, each containing 1,000 million killed bacteria; also in 5 c.c. and 20 c.c. bulbs containing 1,000 million killed bacteria per c.c. Parke, Davis & Co., Detroit.

Furunculosis Vaccine-P. D. & Co.—A staphylococcus vaccine (see New and Non-official Remedies, 1922, p. 306). Marketed in packages of four 1 c.c. bulbs, each containing 2,000 million killed staphylococcus aureus obtained from furuncular lesions; in four 1 c.c. syringes, each containing 2,000 million killed staphylococci; also in 5 c.c. and 20 c.c. bulbs, each containing 2,000 million killed staphylococci per c.c.

Staphylococcus Vaccine (Combined)-P. D. & Co.—A staphylococcus vaccine (see New and Non-official Remedies, 1922, p. 306). Marketed in four 1 c.c. bulbs, each containing 1,000 million killed staphylococcus albus and 1,000 million killed staphylococcus aureus; in four 1 c.c. syringes, each containing 1,000 million killed staphylococcus albus and 1,000 million killed staphylococcus aureus; also in 5 c.c. and 20 c.c. bulbs, containing 1,000 million killed staphylococcus albus and 1,000 million killed staphylococcus aureus per c.c. Parke, Davis & Co., Detroit.

Vaccine Virus-P. D. & Co.—A vaccine virus (see New and Non-official Remedies, 1922, p. 290). Marketed in packages containing one capillary tube and in packages containing five capillary tubes. Each package is accompanied by a bulb for ejecting and a needle for scarifying. Parke, Davis & Co., Detroit.

Erysipelas and Prodigiosus Toxins-P. D. & Co.—An erysipelas and prodigiosus toxin (Coly) (see New and Non-official Remedies, 1922, p. 315), marketed in packages of five 1 c.c. bulbs and in 15 c.c. bulbs. Parke, Davis & Co., Detroit. (Jour. A. M. A., July 15, 1922, p. 217.)

Albumin Milk-Hoos—Dried Protein Milk. — A modified milk preparation having a relatively high protein content and a relatively low carbohydrate content. Each 100 gm. contains, approximately, protein, 30 gm.; butterfat, 25 gm.; milk sugar, 15 gm.; ash, 4 gm., and small amounts of free lactic acid. When suitably mixed with water, albumin milk-Hoos is said to be useful for correcting intestinal disorders of infants and children. Louis Hoos, Chicago.

Neocinchophen-Abbott Tablets.—Each tablet contains five grains neocinchophen-Abbott. For a discussion of the actions and uses of neocinchophen and the description of neocinchophen-Abbott, see New and Non-official Remedies, 1922, p. 88.

Benzyl Benzoate-M. C. W.—A brand of benzyl benzoate-N. N. R. For a discussion of the actions, uses and dosage of benzyl benzoate, see New and Non-official Remedies, 1922, p. 64. (Jour. A. M. A., July 29, 1922, p. 310.)

PROPAGANDA FOR REFORM

"Medical" Testimonials for Chiropractic.—Chiropractors affect, with "patent medicine" fakers, a fine disdain for scientific medicine and the medical practitioner. How readily, however, do both seize with avidity any statement made by an individual who may be presumed to have the right to put "M.D." after his name—provided that statement seems favorable to the cause or may be so twisted as to make the public believe that a reputable physician has spoken a good word either for chiropractic or nostrum industry.

For some time there has been going the rounds a chiropractic advertisement purporting to quote "Opinions of Well-Known Medical Men" on chiropractic. The material obviously emanates from one of the chiropractic "ad" factories. These make a business of supplying the individual chiropractor with advertising copy that he, because of his educational deficiencies, would be unable to write for himself. According to these stock advertisements: ". . . there is an ever-increasing number of M.D.'s all over the United States and Canada who understand, appreciate and practice straight chiropractic to the exclusion of medicine and every other method, as witness the following selected at random." Then follow what purport to be quotations from physicians. An examination of the records of the individuals who are quoted permits an appraisement of their testimonials. (Jour. A. M. A., July 1, 1922, p. 57.)

Digalen.—Digalen was introduced with the claim that it was soluble amorphous digitoxin (a substance unknown to chemists) and with the claim that it posses all the advantages and none of the disadvantages of digitoxin, such as cumulative effect and the production of nausea (claims which have been made for many proprietary digitalis preparations, but which always prove untenable). In 1909, the Council on Pharmacy and Chemistry admitted Digalen to New and Non-official Remedies after the manufacturer had discontinued the palpably unwarranted claims which had been made for the preparation. The Council did not determine whether Digalen contained "soluble amorphous digi-

toxin," but accepted it merely as a standardized and fairly stable digitalis preparation. Subsequently, the claim that it was a stable preparation was challenged. In view of the increased extravagance of the claims for Digalen, the Council in 1915 made a re-examination of this product and directed its omission from New and Non-official Remedies. There is no available evidence to indicate that Digalen has any advantage over tincture of digitalis or the infusion of digitalis for oral administration or that it is equal to ouabain or strophanthin for intramuscular or intravenous injection. With a better knowledge of proper dosage—for instance by Eggleston—an increasing number of practitioners find that, except in exceptional cases, the desired action of digitalis can be obtained by the administration of the official tincture of digitalis. (Jour. A. M. A., July 1, 1922, p. 61.)

Desensitization to Rhus.—Contrary to the theory of "desensitization" to rhus poisoning by internal administration of tincture of rhus, it appears that the susceptibility to rhus may be increased by successive intoxications. (Jour. A. M. A., July 15, 1922, p. 220.)

More Misbranded Nostrums.—The following products have been the subject of prosecution by the federal authorities charged with the enforcement of the Food and Drugs Act:

Hooker's Cough and Croup Syrup (C. B. Kingsley), containing oil of anise, oil of wintergreen, alcohol, sugar, water, blood-root and a balsam, probably tolu.

Madam LeRoy's Regulative Pills (Le Roy Chemical Co.), containing aloes and traces of pennyroyal and tansy.

Naptholene (Dr. E. E. Sonnanstine), containing gasoline, kerosene and a small quantity of resin and red pepper.

Homosan (International Toilet Co.), consisting of tablets containing a trace of strychnin.

Haskin's Cough Medicine (Haskin Medicine Co.), a liquid carrying tar, chloroform, sugar and water.

McMullin's Tonic (Tilden McMullin Co.), containing alcohol, glycerin, iodids, phenol (carbolic acid), and water.

Dupree's French Specific Pills (United Drug Exchange), containing aloes, iron sulphate and a trace of alkaloids, with indications of cottonroot bark and tansy.

Apollo Brand Sexual Pills (S. Pfeiffer Mfg. Co.), containing extract of nux vomica and damiana and phosphorus.

Giepsi Vemela (Giepsi-Vemela Co.), consisting of vegetable extractives, sugar and water.

Montauk Star Brand Pills, containing iron sulphate, aloes, and a trace of strychnin.

Princess Brand Pennyroyal, Tansy and Cotton Root Bark Compound Pills, containing aloes.

Shores Lung Balsam (Shores-Mueller Co.), containing pine tar, ammonium chlorid, a salicylate, chloroform, glycerin, sugar and water.

Shores Mountain Oil Liniment (Shores-Mueller Co.), containing cajeput, wintergreen, sassafras, cedar oils, camphor, ammonia, borax, washing soda, plant extractives, capsicum oleoresin, alcohol and water.

Shores Sarsaparilla (Shores-Mueller Co.), containing extracts of plant drugs, including a laxative, a salicylate, a small amount of ammonium chlorid, a trace of alcohol, glycerin and water. (Jour. A. M. A., July 15, 1922, p. 232.)

Haelepron Tablets Not Admitted to N. N. R.—Haelepron Tablets are made by Bodenstein and Gaslinsky, Berlin, Germany, and sold in the United States by the Haelepron Sales Co., New York. The following, nonquantitative statement of the composition of Haelepron Tablets appears on the trade package: "Haemaglobin, Lecithin, Calc, Lact., Protein vegetab., Ferr. Sacch., Ferr. pyrophos." The Council on Pharmacy and Chemistry finds Haelepron Tablets inadmissible to New and Non-official Remedies because (1) their composition is definite and semisecret; (2) the recommendations for their indiscriminate use are unwarranted; (3) the name is not descriptive of their composition, and (4) they are an irrational and useless combination which can have little, if any, effect on the conditions for which they are recommended. (Jour. A. M. A., July 22, 1922, p. 319.)

Platt's Chlorides.—An advertisement for Platt's Chlorides calls attention to the fact that chlorin antiseptics are at present in favor. The statement is then made that "chlorid of lime" is perhaps the best known of the older chlorin antiseptics. In the advertising it is stated, more or less directly, that Platt's Chlorides contains "chlorid of lime." Chlorid of lime is an unscientific name for chlorinated lime, official in the U. S. Pharmacopeia as Calx chlorinata. An analysis of Platt's Chlorides, made in the A. M. A. Chemical Laboratory several years ago, failed to show that the preparation contained any active chlorin upon which the virtues of chlorinated lime depend. Chlorides were present, but chlorides are not known to have any germicidal effect. A re-examination of Platt's Chlorides, made recently in the Association's Chemical Laboratory, again demonstrated the absence of active chlorin such as is contained in chlorinated lime. (Jour. A. M. A., July 22, 1922, p. 319.)

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

THE VALUE OF QUINIDINE IN ARICULAR FIBRILLATION AND THE METHOD OF STUDYING THE CLINICAL REACTIONS—Thomas Lewis (Am. Jour. Med. Sc., June, 1922): Lewis is giving a series of lectures at the University of Oregon Medical School in Portland, and this abstract is made from the first lecture of the three.

A review is given of the historical aspects relating to the clinical action of quinidine in auricular fibrillation. He believes its original discovery as a remedy for auricular fibrillation is purely accidental, and due to clinical methods of observation.

The effects of auricular fibrillation are briefly these: It paralyzes the action of the auricles, it wholly abolishes the regularity of the natural pulse, two effects, each of which handicaps the circulation in some measure. Third, it raises the rate of the beating ventricle.

Auricular fibrillation throws a greatly increased burden upon the already weak heart, particularly during the uncontrolled state of the heart in exercise. Fibrillation of

the auricles so upsets the balance between the call to work and the power to work that it has been regarded rightly as a most serious cardio-vascular malady. It is upon this condition that quinidine exerts its beneficial influence, destroying the abnormal rhythm. The drug is of use in bringing out a normal rhythm in about 50 per cent of the cases.

Lewis studied various methods of dosage, using large single doses, and repeated average and small doses. He noted that the administration of the drug in large doses caused a prompt reduction in the auricular rate to about 300 or less. The ventricular rate, after the administration of the drug, rises rather rapidly, on the other hand, and may be 140 or even 160 per minute. Recovery from the action of the drug is due to the elimination. Repeated dosage tends to make this auricular retardation and ventricular acceleration more persistent. Lewis believes that the administration of digitalis at the same time is of advantage, for it keeps the ventricular rate at a comparatively low level throughout the quinidine reaction, thereby removing one source of the trouble. He advises a course of digitalis immediately before using quinidine, or a lighter course simultaneous with it. Heavier doses of quinidine, however, may be necessary.

Toxic effects from the administration of quinidine have been noted, such as giddiness, fullness in the head, headache, gripping in the abdomen, or loose evacuations. Palpitation, due to the ventricular rise, need not be of particular concern unless it rises over 100 and the auricular rate falls below 250. In cases of this kind, and generally with high ventricular rate, digitalis should be used in addition. Multiple extra systoles, if oft repeated, should be a signal for discontinuance of the quinidine. Some patients have an indiosyncrasy. A small initial dose should be attempted, followed in twenty-four hours by a little larger dose, then beginning the treatment on the subsequent day.

The dangers of embolism apparently are rather frequent, but not in the experience of Lewis. However, in marked decompensation from the circulatory standpoint, quinidine should not be employed, for the peril of embolism is unquestioned and is too great.

Approximately 50 per cent of fibrillating auricles are only restored to the normal rhythm by its use. Patients with auricular fibrillation, in whom the normal rhythm is restored, feel real benefit, as exercise has no longer such a marked influence in causing discomfort. The drug should not be used in cases of venous stasis. In some patients the restored normal rhythm lasts only a few days or a week, and the fibrillation returns again and again after successive periods of treatment. Others have been benefited for a year or more. In the latter group it must be judged an unqualified success.

F. J. Hirschboeck.

PHYSICAL EXERCISE IN HEART DISEASE. Theodore B. Barringer, Jr. (Jour. Am. Med. Soc., July, 1921), calls attention to the value of blood pressure readings before and after exercise in determining accurately the amount of exercise which should be allowed a heart case.

One of the lessons of war service was the value of exercise to normal hearts and in the so-called neuro-circulatory asthenia cases. From our knowledge of physiology we know that exercise increases heart output, blood pressure and the blood supply to skeletal and heart muscle. The increase in blood pressure is accomplished partly through splanchnic constriction and also by stimulation of the vasomotor center. There is a corresponding dilatation of the vessels in the skeletal and heart muscle accompanying exercise. He decries the usual advice given heart cases not to exercise and believes from his experience that exercise is of value to the diseased heart as well as to the normal heart in increasing its reserve strength.

He has shown that normally blood pressure rises during exercise and that the height attained is maintained for some 60 seconds following the cessation of the exercise and that the pressure gradually returns to the pre-exercise level. In experiments on hearts with valvular and myocardial changes and with little or no reserve he has found that less exercise is required to produce a greater rise in pressure than in the normal case, which is usually 20 to 40 mm. Hg.; that the pressure continues to increase after the exercise has ceased and that a more gradual return to the pre-exercise level results in these abnormal heart cases.

The much used test of hopping 100 times and comparing the pulse a few minutes later to the pre-exercise rate he believes to be of value only to advanced heart cases. He believes the findings of a delayed rise and prolonged fall in blood pressure to indicate an overtaxed heart and uses the test in determining the nature and amount of exercise suitable to a given case.

Two types of exercises are used. The mild include walking, arm and leg exercises and dancing (limited to the one-step). The energetic exercises include the use of dumb-bells (one to fifteen pounds), stair climbing, skipping rope, running in place, hopping and waist exercises. A certain number of units of exercise, called a "close," are used for from five to twenty minutes to be followed by a rest period until pulse and respiration are normal. This is repeated five to ten times during the exercise period. It is difficult to translate one type of exercise into terms of another, but it may be stated that a patient who can swing a five-pound dumbell from the floor over his head ten times in twenty seconds without showing the abnormal blood pressure findings, indicating an excess, can slowly climb a ten foot rise in stair or walk easily on a level. Likewise if he can swing a ten pound bell ten times he can walk a half hour up a slight grade or play nine holes of golf on a not too hilly course.

The value of weight reduction in the treatment of heart cases he believes to be great and has found no weakening effect as so often mentioned from rather rapid reduction.

C. B. Drake.

THE GENERAL SYMPTOMATOLOGY AND DIFFERENTIAL DIAGNOSIS OF DISSEMINATED SCLEROSIS —B. Sachs (Arch. of Neurology and Psychiatry, May, 1922): A revision of our concept concerning multiple sclerosis is necessary and the diagnosis more broadly applied. Some observers of a decade or two ago considered the condition rare; others, nearly as frequent as tabes, depending upon the interpretation of symptoms and the adherence to the diagnostic restrictions emphasized by the French, as represented by the classical triad: nystagmus, intention tremor, and scanning speech. This latter opinion

must be disregarded if multiple sclerosis is to be diagnosed in its early stages.

Sachs' studies are based on a series of 141 cases, 91 of which were from the Mount Sinai Hospital, which is considered essentially an "acute" service. The incidence of multiple sclerosis in the neurologic service was 3.9 per cent; of syphilitic affections of the central nervous system. 23.8 per cent. It was found that multiple sclerosis was more than half as common as tabes dorsalis, and fully as frequent as general paresis, particularly since multiple sclerosis in its early stages does not require hospital treatment.

At the Montefiore Hospital the incidence of disseminated sclerosis and tabes is as 5 to 8.5, with a much greater frequency than general paresis, the latter being only 1.7.

Sachs mentions the following signs and symptoms of multiple sclerosis in the order of their diagnostic importance, based on his study of these cases, and found the most common to be:

Increased and deep reflexes	90%
Fatigue, weakness and stiffness of one or both upper or lower extremities, terminating in spastic paraplegia	81%
Diminution or loss of abdominal reflex	83%
Positive Babinski	78%
Nystagmus	70%
Ataxic tremor of the upper extremities and tremor of the head	55%
Spastic ataxia or ataxic gait	43%
Remissions, leading to disappearance of symptoms	42%
Disturbance in vesical reflex	40%
Scanning speech or some form of dysarthria	36%

In the differential diagnosis, multiple cerebrospinal syphilis is especially to be considered, as the symptoms may closely resemble each other. Remissions and exacerbations are common. Slight beginnings may develop into marked spastic weakness and increase of the deep reflexes.

The positive biologic findings, increase in the globulin, pleocytosis in the spinal fluid, pupillary phenomena, ocular palsy, point indubitably to the constitutional infection. On the other hand, in multiple sclerosis we have the symptoms as enumerated above as being particularly common, those, one might say, distinctive being especially nystagmus, transitory ocular pareses, intention tremor, and spastic contractures. Excessive spasticity would point toward syphilis rather than multiple sclerosis.

F. J. Hirschboeck.

POSTOPERATIVE PULMONARY COMPLICATIONS—Cutler and Hunt (Arch. of Int. Med., April, 1922): The authors will be remembered for their exhaustive, well written paper in the Archives of Surgery, 1920.

The records in the hospitals should be more carefully kept in relation to the development of pulmonary complications postoperatively. A review of the records as kept at present in most hospitals will show a grave laxity in statistical data, which would be helpful in estimating the frequency of postoperative pulmonary complications.

The morbidity in the 1,604 cases considered in 1920 by Cutler and Hunt was 3.92 per cent. Previous records were considerably lower than this, but the maintenance of better hospital records is probably the reason for the increasing morbidity figures, particularly since the mortality percentage is reduced. The mortality perecntage of the morbidity in the series studied was 7.9 per cent. The patients with terminal pneumonia, bulbar palsy, or fatal primary lesions, were not considered.

The authors believe that embolism from the operative field is the most frequent cause of pulmonary complications, and that aspiration plays only a very secondary part. Anesthetists and anesthesia are too frequently blamed for postoperative pulmonary complications, and Cutler and Hunt have taken up the cudgel for them, since they seem to refuse to do it themselves.

It is true that irritation and aspiration from inhalation anesthesia may cause a small percentage of postoperative pulmonary complications, but almost invariably there is a pre-existing pulmonary lesion, such as chronic bronchitis, incipient tuberculosis, or acute respiratory infections. Pulmonary complications occur as frequently with local anesthesia as with inhalation anesthesia. The authors do not believe that chilling or acidosis play any appreciable rôle in the development of complications in the lungs.

A reduction in the number of cases that result in these complications may be had by: (1) A reduction in trauma at operation; (2) accurate hemostasis; (3) the careful control of sepsis; (4) the use of great caution in operating upon patients with demonstrable pulmonary disease. A high fluid intake as a general precaution in giving assistance to the circulatory apparatus will be of definite value once such complications are established.

F. J. Hirschboeck.

CERVICAL RIB, WITH REPORT OF TWO CASES—P. C. Colonna (Amer. Jour. Med. Sc., January, 1922): Detection of cervical rib dates back to the time when the roentgen ray came into use. Rudimentary lumbar ribs are more frequent. They are of little practical importance. A series of one thousand post-mortems has shown that 1 per cent of the cases presented rudimentary ribs. From 60 per cent to 70 per cent of the cases occur in females. According to Beck 67 per cent are double. Of the cervical ribs, the seventh is the most commonly found. Origin is no doubt congenital; symptoms are present seldom before second decade of life. Size has no relation to symptoms. Symptoms are divided into four classes:

(a) Bulging mass in lateral cervical region.

(b) Pressure signs, neurologic or circulatory in character.

(c) Pulsation of subclavian artery.

(d) Cervical scoliosis.

Adventitious ligaments sometimes give similar signs. The brachial plexus and subclavian artery pass over the cervical rib and pressure symptoms referable to nerve and vascular structures follow. Neuralgic pain in neck, head, thorax, arm and hand, parasthesia in hand, inability to extend arm at elbow and hoarseness due to involvement of the recurrent laryngeal nerve constitute a typical clinical picture. The anomalous rib elevates the subclavian artery and the pulsation appears. Aneurisms are rare. Scoliosis present in 16 per cent of cases. Its mere co-existence is possible.

Treatment: If symptoms are acute, patient should be given rest in bed for two weeks. Surgery is always indicated unless there is an aneurism. The posterior cervical

route is preferable. The periosteum should always be removed unless an aneurism is found.

The author reports two cases, both making a good recovery.

J. C. MICHAEL.

THE COLLOIDAL GOLD-CHLORIDE CURVE IN EPIDEMIC ENCEPHALITIS—Catherine M. Howell (Arch. of Neurology and Psychiatry, February, 1922): Examinations were made of 38 cerebrospinal fluids from patients with epidemic encephalitis or convalescing therefrom. They were examined from six days to seven months after the onset of the symptoms. Seven fluids of 38 gave no color change in the colloidal gold-chloride solution, although 5 of the 7 gave positive globulin reactions. The cell count ranged from 2 to 212, with the mononuclear perecntage varying from 60 to 100 per cent. Fourteen of the spinal fluids changed the colloidal gold-chloride solution to red-blue in the lower solutions, which frequently occurs with normal spinal fluid, and never extended above the sixth tube. This group also showed a great variation in the cell count from 2 to 220, with a mononuclear percentage of 40 to 100. The globulins were negative in 3 of the 14 fluids, and the Wassermann, of course, negative in all. Seventeen of the spinal fluids gave a colloidal gold-chloride curve above red-blue in the lower solutions. These fluids were all taken from 3 days to 4 weeks after the onset of the symptoms. The globulins were positive in all of this last group; the cell count varied from 7 to 400. Three of these cases gave typical paretic curves with the gold-chloride solution, although in one patient a week later the typical paretic curve was lost.

It is Howell's belief that there is no characteristic colloidal gold-chloride curve obtained in epidemic encephalitis, but that when a color change does occur it occurs in the lower spinal fluid dilutions, in the so-called "syphilitic zone." The colloidal gold curve does not bear any relationship to the cell count, the percentage of mononuclear cells, nor the globulin content.

F. J. HIRSCHBOECK.

THE MENTAL SYMPTOMS OF MULTIPLE SCLEROSIS—Sanger Brown and Thomas Davis (Arch. of Neurology and Psychiatry, May, 1922): There is no consistent group of mental symptoms occurring in multiple sclerosis. Including euphoria, probably in 90 per cent of the cases we find mental alterations which warrant the term "symptom." The relative infrequency of multiple sclerosis in insane patients is probably due to the fact that the physical condition makes the patient inapt in his physical undertakings, and renders him non-potential from the psychiatric standpoint. Brown and Davis believe that euphoria is very common, and the patients rarely think of their condition as serious nor do they seem deeply concerned. Patients with mental depression and suicidal ideas are occasionally seen. Mental deterioration, as the condition progresses, becomes more common. Auditory hallucinations are not uncommon. Even though there is marked deterioration in multiple sclerosis, the patients do not, as a rule, show much change in their personality, and grave disturbances are rare. Secondary symptoms, such as marked depression and paranoid conditions, depend probably to a great extent on the mental makeup of the individual before the disease develops, but this is not true of the primary mental symptoms, such as euphoria, hallucinations and the confused states.

F. J. HIRSCHBOECK.

FEBRILE STAGES IN CHRONIC NEPHRITIS—J. Oscar Ritchie (Amer. Jour. of Med. Sc., June, 1922): The author calls to mind the observation previously made by many contributors that infection probably plays a part in the etiology of nephritis. Ritchie believes, as a result of his observations, that during the febrile elevations, either due to infection or some other agents, there is a noticeable depression in renal function.

It is not uncommon for cases of chronic nephritis to manifest temperature deviations of this kind, and, as Emerson has previously observed, patients with chronic nephritis and with occasional exacerbations of fever and increased albuminuria, have an added acute process superimposed on the chronic condition.

Other observers have noted that even though kidney function is not materially depressed consistently in acute infectious fever, it is indubitably so in febrile reactions accompanying chronic nephritis. Renal functional tests and the chemical studies of the blood show that during the periods of fever there is a simultaneous functional impairment.

F. J. HIRSCHBOECK.

THE INFLUENCE OF RIGID SALT RESTRICTION IN THE DIET OF CHRONIC NEPHRITIS—Dr. James McLester: McLester has repeated some of the work of Dr. F. M. Allen on salt restriction in patients with chronic nephritis and essential hypertension. His conclusions are not encouraging, as he believes that the patients find the food extremely unappetizing and that weight reduction is marked. The blood urea showed a tendency to increase, and the blood chloride varied but little, although the urine chloride fell to a very low figure. The systolic pressure was little, if at all, affected.

He believes, therefore, that salt-free diets accomplish little, if anything more, in hypertension, than a salt-poor diet as ordinarily prescribed.

F. J. HIRSCHBOECK.

SURGERY

SUPERVISORS:
E. MENDELSSOHN JONES,
LOWRY BLDG., ST. PAUL
VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

TREATMENT OF MULTIPLE PAPILLOMAS OF THE LARYNX IN CHILDREN*—G. B. New (Ann. Otology, Rhin. and Laryng.): The treatment of multiple papillomas of the larynx in children has always been difficult because of the tendency to recurrence. Many methods have been employed, such as tracheotomy, thyrotomy and cautery, en-

*Abstract of paper presented before the Southern Minnesota Medical Association, Winona, June, 1921.

doscopic operative measures, fulguration, the application of various medicines locally, and *x*-ray and radium. During the past six years the author has employed radium both inside the larynx and outside the neck, with more satisfactory results than by any other method.

Mackenzie, Clark and Smith stated that they believe tracheotomy to be the most efficient method of treating papillomas of the larynx. While the value of tracheotomy is well known, cases are reported in which the patients have worn tubes for years without improvement. Polyak advocates the use of radium as a substitute for operative measures. Abbe, in 1898, was the first in this country to treat multiple papillomas of the larynx with radium. Several observers have reported poor results with radium, but on the whole the method seems quite satisfactory. Lynch's suspension apparatus has added a great deal to the efficient care of these patients. His results in removing multiple papillomas by operative measures have been superior to any others on record in this country. He now believes, however, that the best method of treatment is by fulguration or with acid nitrate of mercury.

From the year 1914 to 1920 the author has examined at the Mayo Clinic twenty-six children, between the ages of ten and twelve, who had multiple papillomas of the larynx. Such patients were usually brought to the clinic because of hoarseness or shortness of breath, which began at the age of two or three months as a slight wheezing or crowing cough. Sometimes symptoms do not appear until the child is three or four years old.

Multiple papillomas of the larynx are often diagnosed as laryngismus striculus, asthma, and enlarged thymus, but these conditions can be ruled out by a careful history. The diagnosis can be made only by laryngoscopic examination.

Many of the patients in this series had been operated on by endoscopic methods. One patient had had six thyrotomies and cauteries, which resulted in a marked scarring of the glottis and the necessity of wearing a tracheotomy tube. One patient had had six suspensions and removal of papillomas, but on examination at the clinic the larynx was filled with a papillomatous growth. Nineteen of the patients had tracheotomies previously or shortly after their arrival at the clinic. Tracheotomy was not performed unless obstruction made it necessary.

The treatment in this series of cases was given under ether by means of the Lynch suspension apparatus. Except in a few of the early cases no attempt was made to remove the papillomas. A small tube containing radium salt or emanation was inserted into the glottis and kept moving under direct observation. From 75 mg. to 150 mg. or millicuries of radium were used for from twenty to thirty-five minutes. No screening was used except the silver tube of the container, which was 1 mm. thick. Treatments were given once in six weeks or two months. Patients must be seen at definite intervals. The most suspensions given in one case were six and the least one. In addition to this radium was applied outside the larynx; about 3,000 mg. hours were given, using one inch of wood and 2 mm. of lead screening.

Nine of the twenty-six cases can not be considered in the results, as some patients were not treated at all and others received only one treatment because they could not return at definite intervals.

Of the seventeen patients concerning whom definite information was obtained, eleven are entirely free from papillomas; nine of these had had tracheotomies and the tube had been removed. The tube is always left in place at least six months after the larynx is free from papillomas. One patient suffered a collapse of the trachea above the opening but a two-way tube was inserted for a while and later removed. Two of the eleven patients did not have tracheotomies or treatment by suspension, because of frequent colds, but received external applications of radium. Six of the seventeen patients are still under treatment, five of these during the last year only. Four of the six patients are almost entirely free of papillomas, and the voice is fairly good. Three of these four can cork their tracheotomy tubes. In the entire group the author has not seen any bad results following the use of radium, and he believes this is undoubtedly due to the fact that the radium was under direct observation and was kept moving while in the glottis. FRENCH K. HANSEL.

DIAPHRAGMATIC HERNIA—D. L. Borden (Ann. of Surg., 1922, 75, 337-343): Increased numbers of diaphragmatic hernias have of late been observed, due in part to the types of wounds received in the world war and in part to increased roentgen ray efficiency in demonstrating the condition preoperatively. Previous to 1914, 650 cases had been reported by Griffin, and since then several cases have been reported by various other observers. The anatomical points of diaphragmatic weakness allowing hernial entrance occur at the esophageal opening, and at the juncture between the ensiform and costal cartilages, as well as the space posteriorly between the psoas muscle and the ribs, where muscular tissue is absent. Congenital defects of the dome of the diaphragm may occur, but most commonly there is an absence of muscular tissue about the esophageal foramen.

Acquired hernia may be incited by either increased intra-abdominal pressure or by direct injury and the organ most frequently seen in the diaphragmatic hernia is the stomach. The transverse colon, omentum, small intestine, spleen, liver, pancreas and kidney are noted in the order of their herniated frequency.

The symptomatology varies with the size of the diaphragmatic deficiency and the organ involved in the hernia, but generally pain is noted in the chest and epigastrium immediately after eating. Sudden attacks of dyspnea without apparent cause and emesis without premonitory signs may also be observed. Combined with the visceral displacement must be considered the not infrequent occurrence of such complications as adhesions, constrictions, obstructions, and inflammation of the hernia.

The treatment of diaphragmatic hernia is surgical and the abdominal route of approach is the one of choice. With adhesions preventing hernia reductions from below, an additional thoracotomy may be resorted to in order to mobilize the hernia. With a traumatic opening in the chest wall, one may be able to reduce the hernia from above and repair without celiotomy. Either a long left rectus or an S incision, as used by Bevan, may be advantageously employed in the abdominal route.

Repair of the diaphragmatic hernial opening may be made by the approximation of the pillars of the opening, or, if the diaphragm be lax enough, by overlapping and suturing the free edges. In some instances, obliteration of the defect may be accomplished by suture of the diaphragm to the chest wall. When the defect is too large to close by suturing, the stomach, omentum and mesentery may be so attached to the diaphragm as effectually to close the defect.

A case is reported in which symptoms of six years' duration were present. At operation a large hernia of the large and small bowel was found, which passed through a deficiency in the dome of the left side of the diaphragm three inches in diameter. Reduction of the hernia was followed by a fairly uneventful convalescence, and roentgen ray examination with barium enema three months after operation showed the colon to be entirely within the abdominal cavity.

G. H. JACKSON, JR.

ACUTE HEMATOGENOUS OSTEOMYELITIS—C. L. Starr (Arch. of Surg., May, 1922, pp. 567-587): Starr asserts that the condition which we call osteomyelitis is essentially an inflammation of all structures of the bone and really should be designated a periosteomyelitis. He believes it is practically always a blood-borne infection from a primary focus situated elsewhere in the body. This primary focus may be the tonsils or mouth cavity, but is much more frequently some local infection of the skin as boils or infected wounds or cellulitis. The most common organisms are staphylococcus aureus and some strains of the streptococci. An injury may frequently be the determining factor in localizing the site of invasion.

In his experience, the initial focus of infection is usually located in the juxta-epiphyseal region of a long bone and spreads fairly rapidly along the line of the epiphysis to reach the periosteum. Frank pus is here formed and the infection spreads rapidly under the periosteum, stripping this structure from the bone surface. It spreads less rapidly through the cancellous bone to the medullary canal, and the medullary canal is more frequently invaded through the haversian canals, secondarily to the periosteal infection.

Roentgen-ray findings are always negative in the early stages and remain so until gross destruction of bone has taken place or until involucrum develops. Diagnosis must be made on the signs present. Severe pain in the region of a joint, with a spot of extreme tenderness, in a growing child is extremely significant. If it is accompanied by high fever and rapid pulse with high blood count, the diagnosis is moderately certain. Swelling, redness and edema are later signs. The author cites illustrative cases.

DONALD K. BACON.

BLIND END CIRCULAR SUTURE OF THE INTESTINE, CLOSED ENDS ABUTTED AND THE DOUBLE DIAPHRAGM PUNCTURED WITH A KNIFE INTRODUCED PER RECTUM—W. H. Halsted (Ann. of Surg., 356-64, March, 1922): Halsted reports on an experimentally developed method of enteroanastomosis in which superior asepsis can be maintained. This operation has been performed on dogs but not on humans to date.

The procedure is as follows: The mesenteric blood vessels of the gut to be resected are divided between ligatures and mobilization completed. The intestine is next clamped and tied about with a ligature adjacent to the points where it is to be divided. Purse-string sutures are placed about the ends to be united. The gut is then divided, preferably with the cautery, and the two stumps inverted as in appendectomy. The blind ends are approximated and an axial union made, using two rows of stitches. A knife encased in flexible metal gas tubing with a small cork protecting the point is then introduced per rectum by an assistant. This is a spear pointed knife, sharpened on both sides. The knife is maneuvered by the operator to the site of anastomosis, the metal tube allowed to drop back and the cork removed. The double diaphragm of intestine is then punctured by stellate incisions. The knife is then reinserted into the tubing and removed per rectum.

Halsted reports uniformly good results with this operation. He has seen no ill results from the necessarily large circular flaps on the interior of the bowel at the point of union and no cases of obstruction have occurred. He believes that more nearly perfect asepsis is present than is usually the case and that no more soiling should occur than during appendectomy. This method is of value only in the large bowel.

DONALD K. BACON.

GASTRIC HEMORRHAGE—G. E. Armstrong (Surg., Gyn. and Ob., 1922, 34, 466): Armstrong presents a study of a group of patients having gastric hemorrhage for which no satisfactory explanation has been advanced by the surgeon, the pathologist, the bacteriologist, or the physiologist. In these patients bleeding is of sudden onset and tends to recur at short intervals without apparent cause.

The author cites the case of a civil engineer, thirty-three years of age, who, after a simple breakfast, was seized with epigastric pain followed by brisk hemorrhage. Morphin and ice were used without relief as he immediately had another hemorrhage. Gastroenterostomy was performed and fluids were forced. The patient died twenty-four hours after operation immediately following a third hemorrhage.

Necropsy was negative. There had been no evidence of leukemia or hemophilia. Several cases of this type have been reported. Although surgery is useless, transfusion is of some help.

Transfusion, its origin and history are discussed. Efforts were early made to replace lost blood at any cost, and blood of animals was frequently employed. Then came the period when other liquids, such as salt solution, were used. Crile and others showed, as a result of work done during the war, that human blood was the ideal fluid, its efficiency doubtless being due to contained colloids.

The cases of gastric hemorrhage under consideration in this paper may be due to a microörganism. Armstrong looks for the day when some one following Rosenow's lead will discover an organism to which the cause of this unusual hemorrhage can be attributed.

S. F. ADAMS.

A FURTHER REPORT ON TRAUMATIC FAT NECROSIS OF THE FEMALE BREAST AND ITS DIFFERENTIATION FROM CARCINOMA—B. J. Lee and F. E. Adair (Surg., Gyn. and Ob., April, 1922, 521-31):

Lee and Adair report three additional cases of traumatic fat necrosis of the breast. These cases show hard definite tumors, which require careful study to exclude carcinoma. The microscopic picture shows a chronic productive inflammation surrounding a mass of necrotic and saponified fat with perhaps a few giant cells about the periphery. Any gland tissue present may be the site of inflammatory changes with round cell infiltration about the ducts.

Clinically these cases have occurred with 1.8 per cent of the frequency of primary breast carcinoma and are found during the same age period. In all instances the patients have been corpulent with large, full breasts. A bona fide accurate history of trauma, which is very definite, has been elicited in each case. The tumors are invariably hard and frequently show skin fixation. Inconstant and variable signs are: Ecchymosis following trauma, pain, nipple retraction and deep attachment. In no case were hard, tender or markedly enlarged axillary or supraclavicular glands found.

The time from the receipt of trauma to the recognition of tumor varied from 3 weeks to 10 years.

DONALD K. BACON.

THE DIAGNOSIS AND TREATMENT OF SOME COMMON INJURIES OF THE SHOULDER JOINT—R. W. Lovett (Surg., Gyn. and Obst., April, 1922, pp. 437-444): Lovett reviews the principal points of shoulder joint anatomy and decries the frequency with which the stock diagnosis of subacromial bursitis is made in all obscure conditions of the shoulder. The term neuritis, unless proved, he considers scarcely less objectionable.

For sprain, which in a later stage becomes a periarthritis, or for muscle strain, fixation in an abduction splint is advised to take the weight from the capsule and supporting muscles and relieve pain. This procedure may also be of value in bursitis or rupture of the supraspinatus insertion. These latter conditions may require operative interference with removal of a diseased bursa or fixation with a pin of the bone fragment, which is sometimes detached from the humerus by the action of the supraspinatus at its point of insertion.

DONALD K. BACON.

PEDIATRICS

SUPERVISORS:
FREDERICK C. RODDA,
CHILDREN'S CLINIC, MINNEAPOLIS
ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

MEDICATION IN INFANCY AND CHILDHOOD—James D. Love (Arch. of Ped., April, 1922): During the past two decades, the pediatrician has greatly neglected the science of pharmaco-therapy. A visit to the pediatric clinic of any of our most reputable institutions will convince any one that our teaching hospitals at present are more diagnostic institutes than institutes of therapy. It is not remarkable that the average student of medicine becomes imbued with the mistaken dictum that diagnosis is the one essential and anyone can treat a disease once a diagnosis has been made. With new and valuable drugs at our command and older drugs better standardized than ever before, with striking advances in our knowledge of applied physiology and rational therapy, medication should be a more definite and exact art than at any time in the history of medicine. Many of us take as things for granted the good effects of drug medication and allow our disappointments to render us skeptical, if not indeed nihilistic. Children lend themselves more readily to drug medication than do adults, since, for the most part, but one organ is markedly involved and a qualitative diagnosis is not so essential, and since most often the disturbances of children are functional rather than organic. Pediatricians, then, more than the followers of any other branch of medicine, should become both apostles and teachers of pharmaco-therapy. If a feeding case can be made more comfortable and the duration of the illness shortened by the temporary employment of laxatives and stomachic tonics, by drugs that mitigate suffering, by sedatives that furnish a needed rest and restore the lost balance, we see no reason for their being withheld. The abuse of drugs is by no means confined to the pediatrician, nor is it in any way sectional. The greatest death toll exacted of children for the abuse of drugs is in connection with the use of opium in the management of infectious diarrheas, and when physicians in general realize this, then opium will be assigned a position in the list of useful drugs to which it is entitled.

In the writer's opinion, one of the most pernicious practices now in vogue is the very frequent administration of glandular substances for the many diverse and obscure disorders of sick children. These criticisms apply equally to the employment of mixed vaccines for almost every affection incident to childhood. Unless positively indicated, the good results following the use of vaccines are not commensurate with the pain inflicted on the little sufferer, nor does their use compensate for the dread and horror of the doctor thus invariably inspired.

It is only through close co-operation between our research laboratories and the clinical and teaching departments of our hospitals, through reliable information concerning the potency, physiological action and indication for drugs, based on laboratory experimentation and observation in hospitals by unprejudiced clinicians, that the art of pharmaco-therapy will be advanced.

R. N. ANDREWS.

THE EFFECT OF ARTIFICIAL SUNLIGHT ON METABOLISM—W. Lasch and E. Wortheimer (Monatschr. f. Kinderhlk., November, 1921): The authors show greatly increased calcium and phosphorus retention in three cases of rickets treated by radiation with the quartz lamp. The extraordinary rapidity of the effect strengthens the belief that disturbance of metabolism and not the bony changes is the important thing in rickets. The cause of this retention of calcium is unknown. The authors suggest the possibility of:

1. Changed colloidal condition of the blood.

2. Stimulation of the skin to production of hormones.
3. Action of ferments promoted.

E. F. Robb.

RELATIONSHIP BETWEEN PEMPHIGUS NEONATORUM AND IMPETIGO CONTAGIOSA—Bruno Feilchenfield (Berl. Klin. Wchnchr., Dec. 5, 1921, 58: 1436): The writer reports two cases indicating the identity of these diseases:

First, a case of pemphigus neonatorum followed a few days later by pemphigus vesicles and impetigo crusts in a three-year-old sister, and this in turn followed by typical impetigo contagiosa in a 1½-year-old sister.

Secondly, pemphigus vesicles in a child of one year followed by impetigo crusts in other places.

E. F. Robb.

BLOOD TRANSFUSION VIA LONGITUDINAL SINUS: Harry Lowenburg (Arch. of Ped., April, 1921). Transfusion, as a valuable therapeutic measure, still remains unappreciated. The ease with which the longitudinal sinus route may be employed and the simplicity of the technic are but too little understood. The doctor names various indications for transfusions, but prefers to leave the decision as to the cases to be transfused to the judgment of the operator. He reminds us, however, that transfusion is our best method of supplying fresh, healthy, combative blood, and represents the best anti-toxic and anti-microbic agent to date revealed to us.

He has noted marked improvements in cases of spasmophilia where this method was used and it seems to him with the deficiency of calcium in the blood, together with the accompanying anemia, that to a marked or less degree is present in all these cases, that the lack of those elements is responsible for the state of nervous excitability found in this type of cases. In transfusing these children we raise the percentage of hemoglobin as well as the calcium content and thereby produce marked improvement.

The difficulty experienced in entering the veins of infants under 2 years of age and the ease with which they collapse have had a markedly deterrent influence upon the practice of transfusion at this age. It is known that the anterior fontanel remains open up to the eighteenth month. In many instances, it is patent even longer. The longitudinal sinus traverses this opening in the calvarium directly in the middle line from its posterior to its anterior angle. In the former situation, for all practical purposes, it lies just beneath the skin. Hence, it is readily available to puncture without danger to neighboring structures. The walls of the sinus are not rigid, neither are they adherent to bony structures. Hence, the introduction of fluid is made with comparative ease.

The sinus route is available until the ossification of the covering membrane of the fontanel is practically complete. In fact, ossification may be pretty well advanced before this pathway is no longer available.

The technic is a little complicated and you must have the proper apparatus to do the same.

In 13 transfusions, done by the sinus route, the writer has witnessed no bad effects.

When conditions in the scalp are normal, the sinus lies underneath the skin, but when there is considerable edema it may be a half inch or more below the surface, and is much more difficult to reach. The immediate effect of transfusion is almost dramatic. The tissues become suffused and glow with the ruddiness of apparent health. The ears, the toes, the finger tips, the nose, the lips and all visible mucous surfaces become red and lifelike. Immediate examination of the blood often shows a tremendous polycythemia, leucocytosis and sometimes over 100 per cent of hemoglobin, with all the blood elements increased. During the next 24 hours the secondary effects become apparent. The infant becomes pale again, with a marked reduction of all the blood elements. These gradually increase, and the general outward appearance of the patient improves. There is often a rapid rise in temperature immediately following transfusion, the pulse becomes rapid and the urine shows heavy deposits of urates. These soon disappear.

R. N. Andrews.

EVERYDAY PEDIATRICS—R. M. Pollitzer (Arch. of Ped., April, 1922): In most towns, and especially in rural communities, the general practitioner attends at least nine-tenths of all the sick babies and children. The specialist is seen most often only in desperate cases, or where feeding is the prime consideration. The general practitioner, who is a very busy and popular man, must have some idea of most of the varied branches of medicine and surgery. Yet it is essential that these men, who are the backbone of the profession, should be qualified to handle the majority of their patients in a proper manner. Therefore, the man must be properly trained in the rudiments of pediatrics. Very often he is, and again is not, but more often he does not take the time or trouble to carry out his teaching. After all, the basis for success in medicine, leaving aside all question of personality, is a certain amount of education, medical and otherwise, a moderate degree of common sense and, particularly, the cultivation of the powers of observation. To my mind, the man who fails most often in diagnosing a pedriatic disease is the one who neglects to make a thorough physical examination. The writer has no hesitancy in saying that aside from an examination of the urine the vast majority of diagnoses are missed because the throat and ears are not looked into.

Tonsillitis is extremely common in childhood, and by no means uncommon in infancy. Aside from fever and prostration, there are no clues.

Pyelitis is very common in infants and children, and impossible of recognition without examination of the urine.

Syphilis. No one really knows how prevalent congenital syphilis is, but the morbidity and mortality in infancy has been estimated as very high. The history is generally worthless in this respect; the diagnosis must be made by powers of observation. The writer emphasizes the point that it is comparatively easy at times to make a diagnosis, even to those who do not possess any extra diagnostic ability provided the little patient is thoroughly examined. The author's sole purpose is to show that while scientific medicine requires research and far more knowledge along many lines, yet today we are often not making use in

our daily work of many of the most elementary bits of knowledge which we have already acquired.

R. N. ANDREWS.

CEPHALIC BRUITS IN CHILDREN—George F. Still (Brit. Jour. Child. Dis., London, Oct.-Dec., 1921): Cephalic bruits were found in 17 out of 70 children with open fontanelle examined, and in 13 out of 130 with closed fontanelle. The youngest child in which a bruit was found was 5 months old, the oldest 15¼ years. Most of the bruits occurred in children under 4 years of age.

Still suggests that they may possibly be due to tortuosity of the carotids, at the base of the skull, which becomes less as the skull enlarges, thus accounting for the disappearance of the bruit in older children. Rickets and anemia, which have been advanced as causes of this bruit, were not a constant feature. Still thinks the bruit itself unimportant, but that it is important to know of its occurrence and innocence.

E. F. ROBB.

CAROTINEMIA—Alfred F. Hess and Victor C. Myers (Jour. of the A. M. A., Dec. 6, 1919): About a year ago one of the authors observed that two children in a ward containing about twenty-five infants, from one year to one year and a half in age, were developing a yellow complexion. This coloration was not confined to the face, but involved, to a less extent, the entire body, being most evident on the palms of the hands. The urine was amber and the stools normally yellow. It was noticed that these two children, and only these two, were receiving a daily ration of carrots in addition to their milk and cereal. It seemed as if this mild jaundiced hue might well be the result of the introduction into the body of a pigment rather than any pathologic condition. Two other children were accordingly fed carrots with the same result following, one five weeks later and the other seven. On omission of the carrots from the dietary, the skin became of a normal color again. This subject was pursued farther and the blood examined to see whether the coloring matter could be identified. The serum in the blood, as well as the plasma, was found to be distinctly yellow, much like that which is obtained in cases of jaundice. It was evident that they were dealing with a systemic pigmentation brought about by the introduction of an excess of carotin in the food. These pigments are very widely distributed among our foodstuffs, and it is probable that they frequently play a rôle in coloring the skin. They are nontoxic and cause no physiologic disturbance. The pigmentation may be brought about not only by carrots, but also by any food which contains the carotinoids in high degree—such as oranges, the yolk of eggs, spinach, beets, etc. Not all children will show good pigmentation.

In cases of carotinemia the urine was colored yellow as well as the serum. When a small quantity of concentrated carotin was ingested the pigment appeared rapidly in the urine. These observations are of interest in view of the fact that clinicians as well as physiologists consider that the urinary pigments are formed solely from bile or its derivatives.

R. N. ANDREWS.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

DISEASES OF THE THYRIOD GLAND. Arthur E. Hetzler, M.D., F.A.C.S., Professor of Surgery, University of Kansas School of Medicine; Surgeon Halstead Hospital, Halstead, Kansas; Surgeon St. Luke's Hospital and St. Mary's Hospital, Kansas City, Mo., and to Provident Hospital, Kansas City, Kansas. 245 pages, 106 original illustrations. St. Louis: C. V. Mosby Co., 1922. Cloth. $5.00.

THE THYROID GLAND. Clinics of George W. Crile, M.D., and associates at Cleveland, Ohio. 228 pages. 106 illustrations. Cloth. $5.00. Philadelphia and London. W. B. Saunders Co. 1922.

George Crile and his associates in "The Thyroid Gland" consider the thyroid gland from the standpoint of the various specialties, and a number of valuable points are brought out.

The importance of examination of the larynx is emphasized. About 10 per cent of the cases of exophthalmic goiter show paralysis before operation. Any laryngeal impairment that is the result of pathological condition of the thyroid gland is almost invariably unilateral. Where a bilateral paralysis is present it is usually caused by some lesion in the central nervous system, such as lues, or by a malignancy of the thyroid. At the Cleveland Clinic all goiter cases have a laryngoscopic examination preceding operation, subsequent to leaving the hospital, and then every one to six months afterward.

In toxic goiter an increased systolic and decreased diastolic blood pressure with resultant increased pulse pressure, as already brought out by Plummer and Taussig, is emphasized.

The prophylactic treatment carried out in Akron schools is explained in detail. Sodium iodide in .2 gram doses is used daily for ten consecutive days and repeated every spring and fall. Other methods, as inhalation of iodine, tincture of iodine, syrup of ferrous iodide, etc., are cited. The use of iodine or thyroid products in persons with adenomatous goiter is warned against. They state that about 90 per cent of all malignant tumors of the thyroid arise in fetal adenomata. Iodine given to pregnant women may prevent fetal adenomata, hence cancer of the thyroid in offspring.

Marine and Lenhart are quoted at length regarding the cause and prevention of goiter.

Basal metabolism estimations provide a valuable, although not a specific test, for the presence of hyperthyroidism. These are of value in borderline cases, but of little worth in the determination of operability of cases of hyperthyroidism. Other men, however, notably Plummer and Willius, feel that, in conjunction with other findings, it is a very valuable aid in determining operability and type of operation. A number of conditions that may give rise to increased basal metabolic readings are cited, as: fevers, anemia, leukemia, diabetes mellitus, cardiac dyspnea, asthma, and pituitary disorders.

Boothby and Sandiford, Means, and Du Bois are quoted frequently.

The Goetsch test is described at length and has been of distinct value to them in the differentiation of borderline cases of hyperthyroidism; it states that 89 per cent of the cases of exophthalmic goiter gave positive tests. This is at variance with the opinion of many other men who feel that the test is worth little.

Dr. Crile states that there are 105 papers in which favorable action of *x*-ray treatment is reported. Means and Aub believe that the chances of cure are as good as operative procedure. C. H. Mayo is quoted: "With *x*-ray, remissions may occur, as remissions occur without treatment or with several other methods of treatment. Our experience has been failure or but temporary benefit. It is possible that *x*-ray may destroy gland and produce hypothyroidism. It is difficult to regulate dosage and adds to difficulty of operation." Dr. Crile states the following disadvantages: (*a*) the dose required to produce a given effect is at best a guess; (*b*) relapses common; (*c*) the delay in unsuccessful cases leads to serious damage to certain organs, as myocardium, liver, etc.; (*d*) causes scar tissue and may result in myxedema. It is his opinion that surgery is by all means the treatment of choice.

The preoperative management is elaborated upon and has for its object the preparation of the patient in such a way that the operation will be attended by a minimum degree of shock: to prevent the patient from knowing when the operation is to be done, for several days previous a definite routine is adopted which includes putting the operating clothes on daily; a hypodermic of sterile water every morning; breakfast deferred, and daily administration of nitrous oxide in bedroom. The patient is informed that the latter is for the heart and he is never permitted to become unconscious.

The type of operation, whether ligation or primary thyroidectomy, is dependent upon the severity of the case. Extreme caution in the choice of the operation is advised. Thyroid extract, grains 2, is given the evening before and the morning of the operation to compensate for the removal of the thyroid tissue. This would appear unnecessary, as the manipulation of the thyroid causes the liberation of an excessive amount of thyroid into the blood.

Many other points are brought out that make Crile's book a very valuable reference work. It should be read not only by those interested in the thyroid, but by the profession at large.

A. E. MARK, M.D.

THE MANAGEMENT OF THE SICK INFANT. Langley Porter, B.S., M.D., M.R.C.S. (Eng.), L.R.C.P. (Lond.) Prof. of Clinical Pediatrics, University of California, Medical School, etc., and William E. Carter, M.D., Assistant in Pediatrics and Chief of Out-Patient Department, University of California, Medical School. 642 pages. St. Louis: C. V. Mosby Co., 1922. Cloth. $7.50.

"The Management of the Sick Infant," by Dr. Langley Porter and Dr. William E. Carter, is, as the authors have pointed out in the preface, a book "which deals exclusively with the peculiarities of disease as it occurs in infants." Except for a short but valuable chapter on "General Considerations," the first 160 pages are given over to a consideration of the subject-matter of the entire field from the standpoint of symptomatology. Chapters on each of the following subjects are presented: vomiting, diarrhea, constipation, nutrition, hemorrhage, pain and tenderness, convulsions and syncopes, fever, and cough. The treatment of each of these subjects, while necessarily concise, is surprisingly complete and the reader finds that this portion of the book contains a very commendable differential diagnosis of these conditions in infancy. With such symptoms as constipation, diarrhea, and malnutrition, which not infrequently assume the form of disease entities in infants, the authors spend considerable time in a consideration of their treatment. This is especially valuable since every effort is made to avoid empiricism. The causes of the symptoms are explained and the measures advocated are shown to be directed at these basic factors.

The second part, a section of 320 pages, is given over to a consideration of the subject-matter arranged according to systems. Here also is found the same careful planning and conciseness of text which leaves out no important details that will be of value to the physician in the handling of sick infants. The authors have shown the happy faculty of emphasizing where practical importance demands emphasis and of saving space on things of theoretical or purely academic interest. They seem never to have lost sight of their expressed purpose, namely, to assist the medical man in the handling of his sick infants.

While the book has justified itself in its broad scope, conciseness and clearness of text, and extreme practicability in the first two sections, it remains for the third and last part to stamp the work as invaluable and indispensable to the physician treating diseases of infancy. This is divided into four chapters, one on each of the following subjects; methods, formulas and recipes, drugs, and poisoning. The first of these consists of 105 pages and describes accurately and simply all of the manipulative procedures necessary in the handling of sick infants. Whereas the authors might recommend colonic irrigations, intraperitoneal injection of fluid, puncture of the cisterna magna, etc., in parts one or two, this chapter in part three describes by text and numerous illustrations how these things are done. Under "formulas and recipes" the authors devote about 20 pages to the preparation of the foods that might be needed in the care of sick infants. Under the caption of "drugs," 34 pages are given over to a consideration of the various prescriptions that the authors have found useful in the treatment of the various conditions. The diseases are arranged in alphabetical order and under each is given, in tabular form, the prescriptions with instructions as to use. The last chapter, on "poisoning," consists of but four pages. The first three consider the general immediate procedures necessary in cases of poisoning while the last page is a table of the commoner poisons with the antidote, chemical and physiological, for each.

The evidence of painstaking preparation does not end with the closing chapter of the text itself, for all the wealth of information that it contains is made easily accessible to the reader by an unusually well prepared and complete index, which contributes in no small measure to the extreme value of the work. It is hard to imagine a more complete, yet concise and entirely practical treatment of the subject, "The Management of the Sick Infant," than is contained within the pages of this book.

W. RAY SHANNON, M.D.

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By Examination

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Aurelius, John R.	U. of Minn., M. B., 1922	1072 Dayton, St. Paul.
Bohnsack, Eleanore M.	U. of Minn., M. B., 1922	1302 13th St. S., Fargo, N. D.
Borg, Jos. Franklin	U. of Minn., M. B., 1922	798 Dayton, St. Paul.
Bower, Harriet Jean	U. of Minn., M. B., 1922	113 Church St. S. E., Minneapolis.
Bouma, Lewis Raymond	U. of Minn., M. B., 1922	2901 41st Ave. S., Minneapolis.
Brown, Rolla Oscar	U. of Pa., M. D., 1920	Rochester, Minn.
Cady, Laurence H.	U. of Minn., M. B., 1922	317 Harvard St., Minneapolis.
Collier, Sidney W.	U. of Minn., M. B., 1922	Minneapolis General Hospital.
Culligan, Leo Courtney	U. of Minn., M. B., 1922	2069 Iglehart, St. Paul.
Dixon, Robert Kenneth	U. of Minn., M. B., 1922	St. Charles, Minn.
Dunn, Halbert L.	U. of Minn., M. B., 1922	1920 Franklin Ave. S. E., Minneapolis.
Eisenstadt, David H.	U. of Minn., M. B., 1922	1004 Emerson Ave. N., Minneapolis.
Erpelding, John K.	Jefferson, M. D., 1921	Adrian, Minn.
Friedell, Aaron	U. of Minn., M. B., 1922	220 Harvard St. S. E., Minneapolis.
Gates, Russell	U. of Minn., M. B., 1922	Kenyon, Minn.
Goldberg, Isadore M.	U. of Minn., M. B., 1922	712 Elwood Ave. N., Minneapolis.
Gowan, Lawrence R.	U. of Minn., M. B., 1922	711 Essex St. S. E., Minneapolis.
Gydesen, Carl Sophus	U. of Minn., M. B., 1922	2037 Carroll, St. Paul.
Halper, Philip Allen	U. of Minn., M. B., 1922	223 E. Fillmore, St. Paul.
Hassett, Roger Gerard	U. of Minn., M. B., 1922	509 15th Ave. S. E., Minneapolis.
Herman, Arthur L.	U. of Minn., M. B., 1922	General Hospital, Minneapolis.
Huchthausen, Magdalene	U. of Minn., M. B., 1922	County Hospital, Los Angeles, Cal.
Jensen, Harry C.	U. of Minn., M. B., 1921	919 Fulton St. S. E., Minneapolis.
Josewski, Raymond J.	U. of Ill., Cert. Med., 1922	Maxbass, N. D.
Kamman, Gordon Richard	U. of Minn., M. B., 1922	City Hospital, St. Paul.
Lax, Morris H.	U. of Minn., M. B., 1922	975 Marshall, St. Paul.
Leland, Harold R.	U. of Minn., M. B., 1922	Kenyon, Minn.
Liddicoat, Arthur Gordon	U. of Minn., M. B., 1922	Biwabik, Minn.
McGandy, Robert Frank	U. of Minn., M. B., 1922	General Hospital, Minneapolis.
McLoon, Mary Anne	U. of Minn., M. B., 1922	Miller Hospital, St. Paul.
Monaghan, Raymond Wm.	U. of Minn., M. B., 1922	329 Union St. S. E., Minneapolis.
Nelson, Lewis Edward	U. of Minn., M. B., 1922	329 Union St. S. E., Minneapolis.
Nelson, Marque Ovid	U. of Minn., M. B., 1922	773 Hague Ave., St. Paul.
Neumeyer, Irene O. K.	U. of Minn., M. B., 1922	113 Church St. S. E., Minneapolis.
O'Connor, Irwin Arthur	U. of Minn., M. B., 1922	110 W. Winifred, St. Paul.
Oman, Michael Francis	U. of Minn., M. B., 1922	St. Joseph, Minn.
Prendergast, Harold J.	U. of Minn., M. B., 1922	223 Walnut St., St. Paul.
Roehlke, Arthur Benj	U. of Minn., M. B., 1922	629 Washington Ave. S. E., Minneapolis.
Schmitt, Earl O. G.	U. of Minn., M. B., 1922	Paynesville, Minn.
Scholtes, Harry J.	U. of Minn., M. B., M. D., 1918	Wabasha, Minn.
Sneller, Charles D.	U. of Minn., M. B., 1922	4427 Blaisdell Ave., Minneapolis.
Stillwell, Walter C.	U. of Minn., M. B., 1922	510 Essex St. S. E., Minneapolis.
Sutherland, Kenneth Holden	U. of Minn., M. B., 1922	2619 Oak Park Ave., Minneapolis.
Wilson, Warren E.	U. of Minn., M. B., 1922	Northfield, Minn.

THROUGH RECIPROCITY

Name	*School of Graduation*	*Address*
Aland, Albert Harold	Western Reserve, M. D., 1916	734 Lowry Bldg., St. Paul.
Bacon, Lyle Cholwell, Jr	U. of Mich., M. D., 1921	St. Paul, Minn.
Bowman, Leonard Jas	Baltimore Med., M. D., 1893	Borup, Minn.
Dixon, James F	P. & S., St. Louis, Mo., M. D., 1905	Rives, Mo.
Jacobson, David Jackson	Drake, M. D., 1913	1916 3rd Ave. S., Minneapolis.
Joannides, Minas	Wash. U., Mo., M. D., 1921	2953 Bloomington, Minneapolis.
Norris, John F	P. & S., Baltimore, M. D., 1900	St. Peter, Minn.
Northrup, Laurance Curtis	U. of Neb., M. D., 1919	1035 E. Franklin, Minneapolis.
Olson, Albert Eric	U. of Ill., M. D., 1920	112 N. 20th Ave. W., Duluth, Minn.
Parker, Jas. Wm., Jr	U. of Ill., M. D., 1920	Rochester, Minn.
Pinard, Carl Jos	Creighton, M. D., 1911	Gary, S. D.
Ruediger, Ernest Henry	Rush, M. D., 1903	Bismarck, N. D.
Swendson, Jas. Jay	Rush, M. D., 1921	695 Holly, St. Paul.
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Waas, Chas. Wm	Manitoba U., M. D., 1915	Neche, N. D.

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